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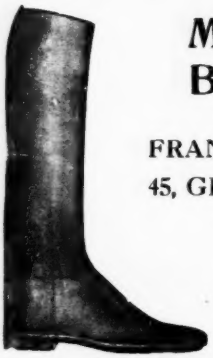

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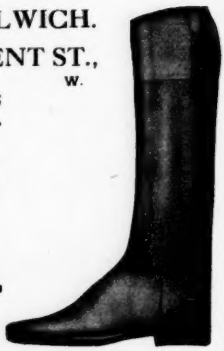

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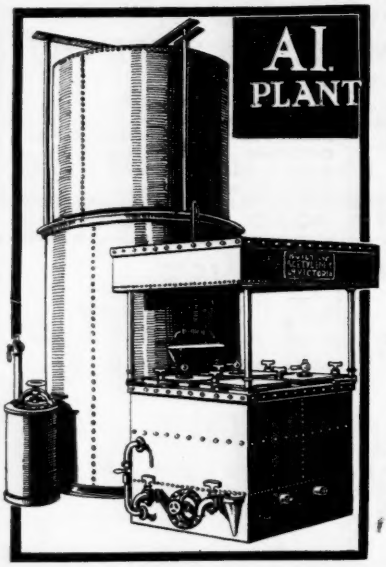

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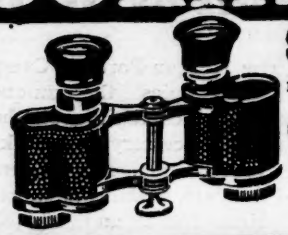

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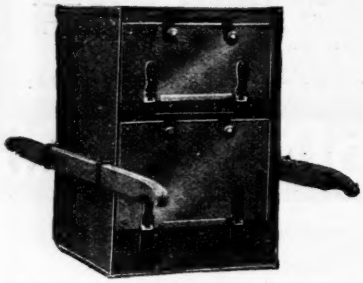

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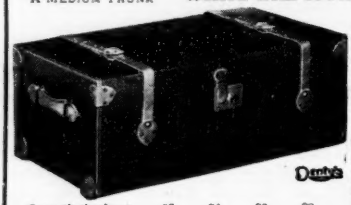

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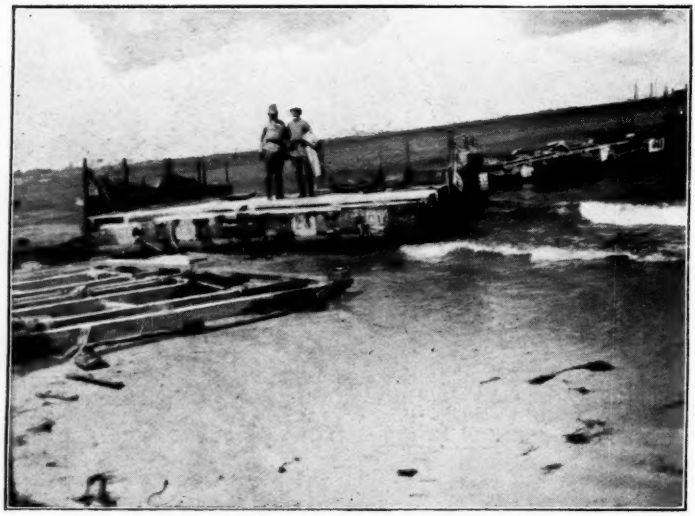
Italian Troops landing at Derna.

[See page 890.]



Rafts used by Italians for Disembarking.

Lieut-General Ameglio (marked by a cross) who commanded the Expedition against Rhodes.

[See page 890.]

ROYAL UNITED SERVICE INSTITUTION.

JULY, 1912.

SECRETARY'S NOTES.

I.—NEW MEMBERS.

The following officers joined the Institution during the month of June:—

Major-General W. Fry, C.V.O., C.B., Commanding 1st London Division (T.F).
Major A. A. McHardy, D.S.O., R.G.A.
Major C. Disraeli, Royal Bucks Hussars.
Second-Lieutenant R. E. Field, Somersetshire Light Infantry.
Major A. de C. Scott, Cheshire Regiment.
Lieutenant B. L. Eddis, R.E.
Commander C. Seymour, R.N.
Major H. R. Hulbert, T.F. (unattached).
Second-Lieutenant P. G. Cropper, 14th Hussars.

II.—MEMBERSHIP.

During the first half of the year 1912, the number of officers who joined the Institution amounted to 135. The various branches were represented as follows:—

Regular Army	93
Territorial Force (including Yeomanry)	21
Royal Navy	13
Special Reserve	4
Indian and Colonial Volunteers	3
Royal Marines	1
	135

This number does not compare favourably with the first half of 1911. The Council, therefore, hope that Members will not relax their energies in introducing new Members, and attention is called to the pink form which is inserted in each JOURNAL for this special object.

III.—LECTURES.

Members desiring to deliver lectures in the theatre or contribute papers in the JOURNAL, are requested to submit them for perusal of the Council through the Secretary. The Council specially hope that they may receive the offer of lectures on Naval subjects.

IV.—THE WAR GAME.

The Home District Military Society, when dissolved, presented to the Institution their collection of maps and materials for playing the

War Game, and these have now been sorted and stored. The Council has arranged that sets of maps and pieces can be lent to any Regular, Special Reserve, Territorial Unit, or recognized society of the same, at a fee of 10/- per occasion, the Unit or Society paying the carriage both ways, and making good any loss or damage incurred. Umpires, Assistant Umpires, schemes and all other arrangements to be made by the parties engaged. Should it be desired, a room at the Institution can be placed at the disposal of players after 5 p.m., at a charge of 10/- per evening, but not less than ten days' notice must be given in respect of it.

V.—CHANGE OF RANK AND ADDRESS.

The attention of members is called to the necessity for communicating any changes of rank or address to the Secretary. It is essential that such notification should be made in writing, and only *one* change of address can be registered each month. The 9th day of the month is the last day on which such change can be notified in order to take effect for the delivery of the JOURNAL of the current month. If such changes are not notified, members themselves will be responsible if their JOURNALS fail to reach them through being wrongly addressed, and officers are requested to write their names, with initials, distinctly on such communications. Several signatures have recently been received which it has been impossible to decipher, and as there are many instances of members bearing the same name and initials, it is requested, therefore, that they will add their rank. The Council beg to draw the attention of members who do not have the JOURNAL sent to them, and have not registered an address with the Secretary, to the fact that they (the Council) cannot be held responsible if such members do not receive any notices that may from time to time be sent out.

VI.—CLOSING OF THE INSTITUTION BUILDING.

The Council have decided to paint the whole of the interior of the Institution buildings in the late summer, and in consequence the Institution will be closed to Members for five weeks, viz., from Monday, August 12th, to Saturday, September 14th, both days inclusive. The Museum will be open as usual, and books can be obtained from the Lending Library on written application.

VII.—ADDITIONS TO THE MUSEUM.

(6468). A painting in water colours of the Channel Squadron, by W. F. Mitchell, dated 1874, comprising the following ships: H.M.S. "Minotaur," H.M.S. "Agincourt," H.M.S. "Hercules," H.M.S. "Sultan," H.M.S. "Northumberland," H.M.S. "Bellerophon," H.M.S. "Monarch," H.M.S. "Topaz."—Given by Spencer Butler, Esq.

(6470). A light cavalry sword, of which the pointed end is missing. It formerly belonged to Lieut-Colonel Sir A. Gordon, K.C.B., who was one of the Duke of Wellington's aides-de-camp at Waterloo, where he was killed.—Given by W. J Wilkinson, Esq.

(6471). A double-barrelled flint-lock carbine, one barrel of which is rifled, the barrels being under and over and not side by side, with a revolving bayonet. Made by D. Egg, of London. The weapon is believed to have belonged to

General Sir Ralph Abercrombie, and used by him in the Egyptian campaign of 1801.—Given by W. J. Wilkinson, Esq.

(6472). A Russian soldier's knife and spoon picked up in the Redan on the morning of September 9th, 1855 (Crimea War).—Given by Lieut.-Colonel H. St. John Mildmay, M.V.O.

PRINCIPAL ADDITIONS TO LIBRARY.

June, 1912.

The Annals of the Yeomanry Cavalry of Wiltshire from the time of its formation in 1794 to 1908. 2 vols. By Henry Graham. 8vo. Illustrated. (Presented by Author) (D. Marples & Co., Ltd.). Liverpool, 1886-1908.

Commodore Anson's Voyage to the South Seas. Crown 8vo. Illustrated. (Presented). n.p., n.d.

Ceremonial. Official Copy. 12mo. 3d. (Presented) (Mackie & Co., Ltd.). London, 1912.

An Historical Sketch of the Predecessors of our Mounted Infantry, Horse Archers, Mounted Arquebusiers and Dragoons. By Major H. C. Purdon. 8vo. (Presented by the Author) (Geo. Toulmin & Sons). Preston, 1912.

Dictionary of National Biography.—Second Supplement—Vol. I.—Abbey—Eyre. Edited by Sir Sidney Lee. 8vo. 15s. (Smith, Elder & Co.). London, 1912.

Etude Sur les Caractères généraux de la Guerre d'Extrême—Orient. By Captain Culmann. 8vo. 2s. 8d. (Berger-Levrault et Cie.). Paris, 1909.

The Evolution of Sea-Power. By P. A. Silburn, D.S.O. 8vo. 7s. 6d. (Presented by Publishers) (Longmans, Green & Co.). London, 1912.

The Life of Nelson. By Geoffrey Callender. Crown 8vo. 1s. 6d. Illustrated. (Presented by Publishers) (Longmans, Green & Co.). London, 1912.

Protection in War. By Major-General F. J. Aylmer, V.C., C.B. 8vo. 7s. 6d. (Presented by Publishers) (Hugh Rees, Ltd.). London, 1912.

The Day of the Saxon. By General Homer Lea, U.S.A. 8vo. 7s. 6d. (Presented by Publishers) (Harper & Brothers). London, 1912.

God's Test by War. By H. F. Wyatt. Crown 8vo. (Presented by the Author) (Thomas Burleigh) London, 1912.

The Ulm Campaign, 1805. By Colonel F. N. Maude. (Special Campaign Series). Crown 8vo. 5s. (Presented by the Publishers). London, 1912.

La Chronique de Frœschwiller. By C. Klein. Translated from the German by Lieut. A. Delachaux. Crown 8vo. 2s. 8d. (Delachaux & Niestlé). Neuchatel, 1911.

Les Armements Allemands—La Riposte. By Captain Pierre Félix. 8vo. 1s. (Presented by the Publishers) (Berger-Levrault). Paris, 1912.

Tendances tactiques de notre Cavalerie. By Commandant Jibé. Crown 8vo. 1s. (Henri Charles-Lavauzelle). Paris. n.d.

Italy's War for a Desert. By Francis McCullagh. 8vo. 10s. 6d. Illustrated. (Herbert & Daniel). London, 1912.

The Aeroplane in War. By Claude Grahame-White & Harry Harper. 8vo. 12s. 6d. Illustrated. (T. Werner Laurie). London, 1912.

Reminiscences of a Blackwall Midshipman. By W. I. Downie. Crown 8vo. 3s. 6d. (W. J. Ham-Smith). London, 1912.

THE LANDING AT DERNA.

The landing of the Italian troops at Derna, which forms the subject of the first two photographs in this month's Frontispiece, took place on the 18th October, 1911. On the 15th October the convoy, with the escorting warships, appeared off Derna, and, after some hours bombardment, an endeavour was made to land 500 men. This attempt was repulsed by the fire of the Turkish garrison, about 150 strong, entrenched on the beach. Owing to the roughness of the sea no further attempt was made till the 18th when, after another bombardment by the warships, a battalion of Alpini with some field artillery and engineers succeeded in landing and occupying the town, which had in the meanwhile been evacuated by its garrison; the landing of the remainder of the troops then took place without further interruption.

The disembarkation rafts shown in the third photograph are of the pattern described on page 1679 of the December, 1911, JOURNAL. They are 19 ft. six ins. long by nine ft. nine ins. wide, and three feet high, and carry from 38 to 40 men, or eight to ten horses each. They can be joined together in pairs, and the rafts thus formed can take 90 to 95 men, or 20 to 24 horses each. Four of these rafts were carried—two forward and two aft—on each of the Italian troop transports. It was found that they could be lowered into the water and locked together in pairs in four or five minutes, *in calm weather.*

Lieut.-General Ameglio, who is seen in the last photograph, was born in October, 1854, and received his first commission in 1872; he was promoted captain in '86, major in '94, lieut.-colonel in '98, colonel in '04 and Major-General in June, 1910. His war services include the "African Campaigns" of '87, '88, '89, '90 and '93, and '96 and the "Campaigns against the Dervishes" of '88—'97. He was specially mentioned in despatches for his services in the "Campaign against the Dervishes" in 1893, when he was commander of the garrison of Cheren. He was three times decorated, viz.:—for distinguished service at the actions of Aga Debra Matzo and Debra Aila (Abyssinia), and for his gallantry at the Battle of Adowa. He also took part in the campaign in the Far East at the beginning of this century.

At the outbreak of the war (September, 1911) he was in his 58th year, and as he had never passed through the War School, he had apparently little prospect of further advancement. On the formation of the Expeditionary Army Corps he was given command of the 4th Brigade, with which he sailed for Cyrenaica on the 17th October. Two days later he commanded the force which landed near Benghazi in the face of opposition, and drove the Turkish garrison from their position at Berca. On the 12th March of this year, by a sudden offensive movement against the Fojat Oasis, he inflicted a crushing defeat on the Turco-Arab forces near Benghazi; for this victory he was promoted to lieut.-general, and was shortly afterwards given command of the expedition which occupied Rhodes and compelled the surrender of the garrison as described in last month's JOURNAL.

THE JOURNAL
OF THE
ROYAL UNITED SERVICE INSTITUTION.

VOL. LVI. JULY, 1912. NO. 413.

[Authors alone are responsible for the contents of their respective Papers.]

THE CASE FOR THE EIGHT COMPANY BATTALION.

By CAPTAIN R. J. KENTISH, Royal Irish Fusiliers.

On Wednesday, 1st May, 1912.

Lieut.-General Sir H. L. SMITH-DORRIEN, K.C.B., D.S.O., A.D.C., in the chair.

ON the 19th December, 1911, General F. I. Maxse read a paper in this Institution on Battalion Organization. In this paper he advocated the abolition of our eight company system, and the substitution in its place of a four company system. This paper rather took those regimental officers, who do not hold General Maxse's views, by surprise, and consequently there were very few officers present prepared to speak in favour of the eight company system. In the *Morning Post of* the 20th December, the subject was given much prominence; a leading article supported the views taken by General Maxse, and with much earnestness and force the writer stated that he knew that the whole question of Battalion Organization would shortly form the subject of a searching investigation, and this article concluded with the following sentence:—

"Should it then be decided that changes are desirable, those changes will assuredly be carried out."

Now, gentlemen, let me assure you of the fact that an ever-growing number of officers do not desire any radical change in our organization; it is felt that our present organization is the best for peace and war, and I hope to be able to prove that this is so by setting before you the many advantages which the small company system has over the big company system. It is worthy of note that none of the advantages are to be found in General Maxse's paper, and so I come here this afternoon to speak on this subject, and the line I propose to take is this:—I intend to follow the principal points raised by General Maxse in his paper and wherever a point of importance

either for or against the four company system, or against the eight company organization has been omitted, I shall refer to that point of omission.

And I desire to add this to my prefatory remarks: my experience of 15 years soldiering, during which period I have served for brief periods on the Staff, enables me to speak with knowledge of my subject. The first part of this paper refers almost entirely to the tactical aspect of the case, and for this reason I have assumed that the battalion, whether of four or eight companies, is at war strength. The second part of my paper deals with the administrative side, and other matters affecting the question.

PART I.

THE TACTICAL ASPECT OF THE QUESTION.

In reading through General Maxse's paper I was astonished to read this statement:—

"Our quarrel is not only with the eight company battalion, which we think mischievous; but also with the fact that a company has no scientific organization to enable it to fight with advantage."

Gentlemen, is this so? What is our organization? A company in an eight company battalion is composed as follows:

	Officers.	Colour Sergt.	Section Sergts.	Corps.	Rank & File.
War (A)	3	1	4	5	109
Peace (B)	3*	1	3	5	79

In both (A) and (B) the organization is built up with the squad as the smallest tactical unit, then the section composed of two squads, then the half company of two sections, and, finally, the company of two half companies or of four sections. Each squad consists in war of one corporal or lance-corporal and eleven privates, reduced in peace to one corporal or lance-corporal and eight privates. There are undoubtedly weak spots in the system—there are in every system—but those of us who have served continuously as regimental officers for many years know that we have a scientific organization, that is entirely adaptable to our peculiar conditions. This organization has been very materially bettered since the South African War by the splitting up of the somewhat big sections into squads, and we regimental officers appreciate to the full the value of the change and the scientific brain that prompted it. We should, perhaps, prefer to have more men available in our home battalions, and a few more subaltern officers and section sergeants to command these men, but to condemn a system and to assert that there is no science in its organization, because the peculiar conditions of our home service have up to date

*Some companies have three officers, others two only.

failed to supply that system with men to work it satisfactorily is, I think, rather unfair criticism of our General Staff.

The Platitudinous Military Axioms.

I turn to what General Maxse calls platitudinous military axioms, and I only mention four of these, because the remainder are applicable to either system.

"The object to be achieved through organization is to facilitate by forethought in peace, the difficult task of launching a battalion of a thousand men into battle and controlling them throughout."

But surely the organization of our companies *is* so arranged, and with eight well commanded and well trained companies, a battalion commander, if a well trained officer himself, ought not under ordinary circumstances, to experience great difficulties in launching his battalion into battle. But, gentlemen, the question of controlling them once launched is a totally different question. In the initial stages, control by the battalion commander will not be a very difficult matter, but once companies come within the effective rifle fire of the enemy control will be practically impossible, and then it will not be a question of four, six, or eight companies, so far as the winning of the battle is concerned; but the personality and ability of the squad and section leaders, and of the company officers backed by a body of well trained men strong in esprit-de-corps will assuredly triumph.

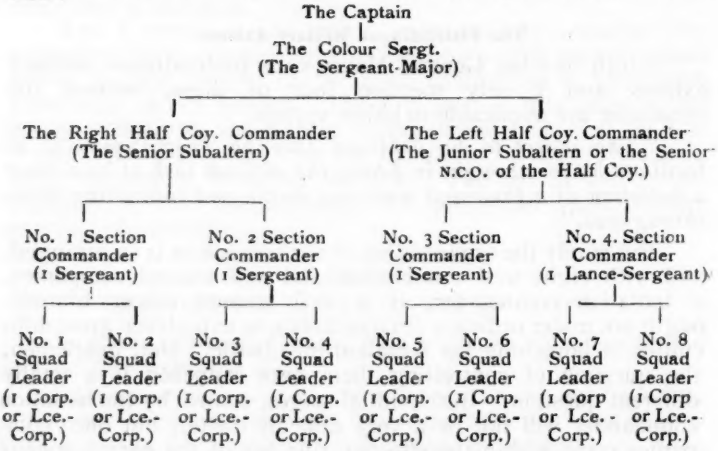
"Co-operative fire tactics are the essence of good infantry work and companies should be organized to facilitate fire tactics."

Why is this a plausible platitude in our company organization? Our system to-day gives ten or twelve men to a squad commander; this is the greatest number of rifles that one man can conveniently and advantageously control in action, and if the squad commanders have been well grounded in their work and the men are alert and responsive, fire tactics in companies should be easy of accomplishment. But I regret to say that neither our officers, non-commissioned officers or men display a very great knowledge of fire tactics and fire discipline for the simple reason that sufficient importance is not attached to it, and consequently, although we are brought up on the theory of co-operative fire tactics, we never receive that amount of practice, which the authorities at the School of Musketry, Hythe, lay down as indispensable to the efficient training of our infantry.

This fact, however, should not be any excuse for saying that our organization does not facilitate co-operative fire tactics. It is not the organization, but the human element which is at fault.

"The chain of command and responsibility should be clearly defined and habitually practised by all ranks."

Here is the chain of command in our company organization :—


The Captain
The Colour Sergt. (The Sergeant-Major)
The Right Half Coy. Commander (The Senior Subaltern)
The Left Half Coy. Commander (The Junior Subaltern or the Senior N.C.O. of the Half Coy.)
No. 1 Section Commander (1 Sergeant)
No. 2 Section Commander (1 Sergeant)
No. 3 Section Commander (1 Sergeant)
No. 4. Section Commander (1 Lance-Sergeant)
No. 1 Squad Leader (1 Corp. or Lce.-Corp.)
No. 2 Squad Leader (1 Corp. or Lce.-Corp.)
No. 3 Squad Leader (1 Corp. or Lce.-Corp.)
No. 4 Squad Leader (1 Corp. or Lce.-Corp.)
No. 5 Squad Leader (1 Corp. or Lce.-Corp.)
No. 6 Squad Leader (1 Corp. or Lce.-Corp.)
No. 7 Squad Leader (1 Corp or Lce.-Corp.)
No. 8 Squad Leader (1 Corp or Lce.-Corp.)

If the captain is away, the senior subaltern commands, and so on; this is clear enough, and so is the question of responsibility—the captain is responsible to the commanding officer for the conduct of his company; if the captain is rendered *hors de combat*, the senior subaltern assumes control, and also any responsibility attached to it. Whether in peace or in war this chain of command and responsibility is being frequently practised, and similarly the squad commanders are responsible to their section commanders, and the section commanders to their officers, and the lower ranks constantly assume the duties and responsibility attaching to the duties of the higher ranks with excellent results. And in view of the fact that on mobilization some of our senior non-commissioned officers may be immediately promoted to commissions and the junior corporals to sergeants, there can be no better way of instructing these individuals in the duties they are to perform in war than by giving them a preliminary canter over the course in peace.

"The best way to train young officers is to give them the responsibility of managing a definite command, as in the Navy, the cavalry, and the artillery. The command of a half company is not a definite command because the half company is not a tactical unit."

I candidly confess that this has caused me many sleepless nights; it had never occurred to me until I heard this statement in this Institution, that a subaltern had no responsibility or no definite command. If the captain is an earnest officer and one who places the interests of his company on a high plane, and if, moreover, he knows how to apportion the work, the subaltern will find he has enough to do to last him from morning till night on most days of the week.

Both in peace or war it is possible to give our subalterns definite commands and plenty of responsibility. Put them in positions that will bring them into close contact with their men both on and off parade, and that will enable them to gain an insight into their characters; put them in charge of the musketry training, of the bayonet fighting instruction, or of the athletics generally, or of the messing of their men; tell them to address their non-commissioned officers on any professional subject contained in our Infantry Training or other text books; tell them to make themselves acquainted with the traditions of their regiment, and to impart their knowledge to their men. Above all tell them to gain the goodwill of their men, perhaps the most important of all their duties, and one that is often most difficult of accomplishment, simply through ignorance of the best way to set about it. Give them these very definite duties to perform in peace and judge of their ability by the results obtained. In war the knowledge they have gained in this way of the characteristics of their men will enable them to accomplish much. Gentlemen, a subaltern, though he may not have a definite command in the shape of a section or a company, has a magnificent task before him in helping his captain to train the men, and in assisting in the cultivation of the soldierly spirit; and if he is doing this to the best of his ability, he is simultaneously helping to get his company fit for war. What more definite task could we captains assign to our subaltern officers? Do not then let us hear his duties again referred to as of no import.

The Battalion In War.

General Maxse referred to the new situation that had arisen in Europe, and he stated that this situation did not exist, when our Army was distributed in its foreign garrisons and made up to war strength in them. I do not altogether understand the allusion. I personally cannot see that the situation in Europe, so far as it affects the organization of the British infantry, has in the last 100 years undergone any real change. The British nation is certainly on better terms with her closest and nearest neighbour than she used to be, and on far worse terms with one not quite so close; but whether we, as a nation, are on good or bad terms with our neighbours or whether the political state of Europe has changed in any marked degree for better or for worse, I cannot see what that has to do with our Battalion Organization. And then again he refers to the fact of the naval authorities having seen fit to scrap obsolete ships and concentrate, and he goes on to say " May I suggest that perhaps the Army may have to scrap some of its cherished ideas in order to face the situation in its turn." To this I say that if it can be conclusively proved that any of our ideas on any subject affecting any branch of our Army are impeding progress, then let us by all means root them out tooth and nail.

But before we take action let us be quite sure that the ideas we propose to scrap are obsolete, and that a change is desired.

Tactical Considerations.

" Whether we fight alongside of and in close co-operation with a European Army or whether we undertake a separate mission, as the Ally of a friendly Power, it is obvious that our expeditionary force must be ready to take on twice or thrice times its own numbers on the field of battle."

The writer goes on to say that although our fire tactics are as good as, or better than any in Europe, we fail to develop them owing to the eight company system, which destroys the initiative of subordinates without increasing the legitimate control of superior commanders. In other words, the eight company system is unsuitable to modern tactics.

With this statement the great majority of company commanders with whom I have discussed the subject are in disagreement. My own experience in command of a company at war strength in action proved, if anything, that the sections were too big for one man's command, and this defect was remedied in the Infantry Training Manual of 1905, which introduced the squad system, giving ten or eleven men to each squad commander—an organization we retain to-day, and one we hope to retain until arguments more conclusive than those already put forward are deduced against it.

The Eight Company Battalion in the Attack.

General Maxse instanced an eight company battalion being launched to the attack, and told of the difficulties of control and co-operation when the battalion became hotly engaged. But what system will not be confronted with those difficulties when close contact is established. Think for a moment of the din and of the inevitable confusion, and then make up your minds, or try to, whether a four, six, eight, ten, or twelve company system is going to carry you through triumphant, and bring you success in battle. Gentlemen, I have already stated that victory will not depend on the number of the companies in any particular battalion, but on the intelligence, personality, and popularity of our company officers; and if they in turn are followed by well trained non-commissioned officers and men, literally breathing their regimental traditions, there will be no doubt as to which side will win the day.

To return to the launching of the eight company battalion to the attack, the commanding officer has explained the situation to his eight company commanders, and this information is transmitted to the subalterns and section commanders, who in turn transmit it to the men. There may, or may not be time for it to get to the men before the order to move is given, but the opportunity will come in the course of the advance, although not much

explanation will be required when the bullets are flying—commonsense will tell most of the information that is necessary. But the objective of each company will be known, and then the matter must be left to the commanders.

THE RÔLE OF THE SENIOR MAJOR.

If the senior major is present with the firing line of four companies his advice will be most welcome—he will not hamper the situation. To-day our senior majors are, we hope, efficient, and advice from efficients is always welcome.

General Maxse has asked this question, "How is the senior major to exercise any useful or desirable control over four independent companies hotly engaged with the enemy and spread out along a frontage of nearly half a mile?" The answer is, that control is maintained in the attack not by any senior major, but by the lucidity of the commanding officer in his orders to his company commanders, and the intelligence shown by the latter—in correctly interpreting those orders—and in always having in view the objective of the attack. This, in the initial stages of the advance, and the senior major's position would then be either in the centre of the line or on one of the flanks. Once the companies become hotly engaged with the enemy, control by any one man will be entirely out of the question. There may be brief moments when taking advantage of the sheltering lee of a hill or an open ditch a consultation may be possible, and if so, the presence of the senior major will be most welcome. If no such consultation is possible, then the attack must proceed, and reliance be placed on the intelligence and personal courage of both officers and men to emerge triumphant.

The Four Company Battalion in the Attack.

THE RÔLE OF THE SENIOR MAJOR.

Now take the case of the two big companies in the firing line and let us see whether General Maxse's contention "*that the senior major's job would be to co-ordinate the general advance, and without interfering in details arrange with the two company commanders for mutual assistance in moving forward from fire position to fire position*" is correct or not, and whether it is any easier for the senior major to control two big companies than four small ones. For this purpose I have drawn two plans showing the formation in the field of two companies and four companies in the firing line under the senior major.

Now whether we have two big companies of 250 each or four small companies of 125 men each in the firing line the frontage occupied will be indentical. I wish you to pay particular attention to this point, because I think it has been overlooked in this argument. I first of all instance the case of the firing line hotly engaged with the enemy having reached a

nullah or some natural feature of the ground which gives ample cover to all; from this piece of cover the senior major wishes to reorganize his attack line and make preparations for a fresh advance with a slightly altered objective. Let us take the four company organization first. He sends for the two company commanders and explains his orders. They in their turn send for their seconds in command, explain to them the orders, and they in their turn send—for whom? Do they send for the four subalterns, or how is it done? To my mind it is

PLATE I

4 Companies in the firing line in an eight-company battalion.

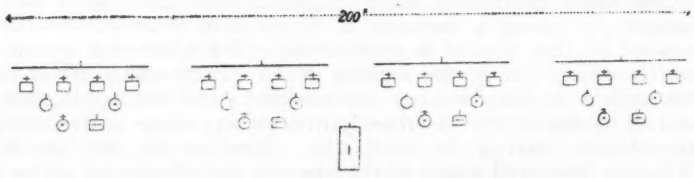
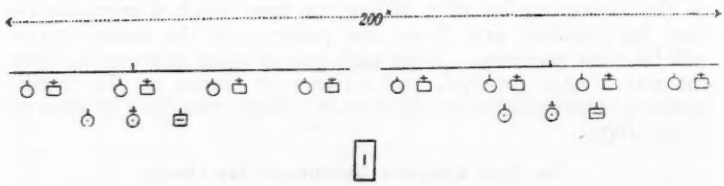


PLATE II

2 Companies in the firing line in a four-company battalion.



a small point, but so much stress has been laid on the facility with which control can be exercised and co-operation assured by the four company system that I am most anxious not to omit any point, either for or against either system. Let us suppose that the two seconds-in-command each assemble their four subalterns, and then finally the subalterns impart the situation to their sections. There is another way, of course, and that is for the senior major in the first instance to assemble the majors and their seconds-in-command, but this does not appear to have any advantage over the eight company system. In any case the information for the fresh advance eventually reaches the men, although the process in getting it there appears to me a laborious one. Now what do we find in our present system? The senior major assembles the four company commanders, gives his orders and tells them to move. Two courses are open to these company commanders: they can either explain the situation to the two half company commanders, and they in turn give it to their half company or section commanders, or better

still, each company commander can assemble his half company and section commanders and give them the information in this way. I cannot see that the method of imparting information in the four company system has any advantage over the eight company system. I must remind you that this scene has been enacted the whole time under cover.

Now turn to the case where the firing line is hotly engaged with the enemy. General Maxse speaks of the impossibility of the senior major getting into touch with the outer companies on the flanks of his firing line in an eight company system. He says that he is a good man wasted, because he has been given an impossible task. But why should he be wasted? Casualities would appear to have been altogether overlooked in the argument. A senior major's advice to a company that had lost all its officers in the advance surely would be of supreme importance, or the active leadership of even two companies to an important point, at a critical moment, surely might come within the scope of a senior major's duties. A senior major has no actual command in peace, and so has none in war, but those of us who know what influence a senior major has on the well-being of a battalion from every point of view, if he applies himself to his job, will appreciate the value of having such a man with us in the firing line at a critical moment. But as far as the control of the general advance is concerned you may certainly make it simpler in the four company battalion so far as the actual giving of the orders in the first instance to the two company commanders is concerned, but you will most certainly not, so far as getting the information from those two company commanders to the two junior captains, the eight section commanders, the sixteen squad commanders, and the 500 men is concerned. For movement in the firing line is a most hazardous thing, and intercommunication ever presents the very greatest of difficulties, but these difficulties will never be overcome by changing our organization. There I leave the battalion commander and the senior major and their relations with the company commanders.

The Rôle of the Captain.

We will now take the case of one of the captains, and his command in this first battle. General Maxse's great point with regard to the captain's command is, I think, this: the subalterns may be unknown to him, the section sergeants may be men who have just been promoted, the men for the greater part are reservists; perhaps 30 per cent. are serving soldiers and 10 per cent. recruits. But why should the system be condemned on this account? To take the subaltern's case first; it is said that he has no command, but he has, for he commands 50 men in this mobilized company, ten more than he would command under similar conditions under the four company system. General Maxse says in the eight company system

possibly the captain will not know one of his subalterns; to this I say in the four company system possibly the major would not know either his captain or his subalterns. And so with the section sergeants, the same applies in both systems; but this is not a serious matter, because well trained corporals should be and are always fit to command sections in the same way that every well trained captain ought, if suddenly promoted, to be able to command a battalion. But I mention the point because it has been brought forward as a weak spot in the captain's command in our system, whereas if you like to call it a weak spot, I maintain that it exists in either system. And why there should be any difficulty in sending one forward with the firing line, and keeping the other in reserve is not evident. This is described as a makeshift arrangement, and it has been said that owing to a subaltern having no definite command in peace his duties have to be improvized in war. I do not think this is quite correct. I think we may reasonably expect to find that the captain will, on mobilization, know one of his two subalterns, and if he does not know the other and there is an important duty to be carried out by one of them, he will naturally send the one he knows rather than the one he does not know. This again is a matter of common sense, and I think a line frequently taken by Divisional and Brigade Commanders who, having to detach a brigade or a battalion on some special mission of importance, will naturally send that brigade or that battalion which is, at the moment, commanded by the man in whom they have the greatest confidence. But we captains know that our subalterns have a very definite command in war, and that is the command of a half company of 50 men, and the chances are greatly in favour of the subaltern having to command the whole company should the casualties be at all severe, as they most assuredly will be. Therefore we say let us train them to get a thorough knowledge into the working and the interior economy of the whole company, and we are training them to become most useful members of the regiment, and they will be a great asset to their captains in this first battle, being able from their knowledge of every man in the company to take command, and to lead it in an emergency well. A battalion with its company officers and men trained on these lines, viz., the officers to accept responsibility, to know their men and to lead them well and the men to follow because they know their officers, will win the battle, gentlemen, not in spite of, but with the aid of its organization.

War Experience of the Eight Company Battalion.

In all the papers that I have read on this subject I have not as yet heard any officer relate his experience of how our present system has worked on active service. It would be a matter of extreme interest if in the discussion that will follow later some officers would tell us of their experiences of the eight company organization in war. My own

earliest recollection carries me back to the 24th September, 1899, when in Alexandria I stood on parade as the right half company commander of a company of my battalion about to embark for South Africa; it was a good enough command for any officer of my age, service, and experience, and I am sure that my captain had no fault to find with his command, viz., two subaltern officers, four section commanders, and four sections of 25 men each.

At Talana Hill, four companies of my battalion were in the firing line advancing to the attack under the second-in-command. I remember seeing this officer just after we started; we had been given our objective very hurriedly owing to the fact that we had been taken by surprise, and were under shell fire from the enemy's position. After going two or three hundred yards the second-in-command was wounded; still the companies maintained their direction and gained their first objective, a waterless donga running at the foot of Talana Hill. Here the lines were reorganized, and the advance progressed until the hill was captured. I have never heard it said that our eight company organization failed the Dundee Brigade in that action, nor have I heard it stated that it failed our Army in any other of the big actions at the commencement of the war.

And if we are agreed that our organization has successfully withstood the exacting test of war, then I say "Let well alone and leave us in peace to improve our present organization, but don't destroy it."

The Four Company Battalion in War.

I do not propose to enter into details, because I have already referred to the principal features of this system in discussing our present organization. But one point occurs to me which I have omitted, and I think it is a most important one and that has to do with the handling of these big companies both on the march and when debouching from roads or defiles on to plains or to open country, especially when under fire; not a heavy fire, but a nasty irritating fire with a man dropping here and there. We have heard a great deal of the advantages of the commanders being mounted, and I am sure we are all agreed as to those advantages in certain circumstances. But, gentlemen, we have heard very little of the disadvantages that must occur over and over again. For instance, the occasion will arise when the company commander will be compelled to get off his horse owing to the enemy's fire, and to take his place in his company as a dismounted officer, and then what does he see in front of him? He sees a small battalion consisting of 250 men, whom he wishes to open out rapidly; he is anxious to open fire with a section or two sections on his extreme left flank, and he happens to be on the extreme right flank, perhaps 200 yards away; he may be a small man with a weak voice, perhaps his captain is on the extreme left flank, most probably he is; and all the time the

enemy are making headway, and their fire is growing in intensity, and 120 of his men are reservists, whom he has probably never seen before—I quote General Maxse's own words—20 of them are possibly recruits, one or two of his subalterns are unknown to him, and his section sergeants have only just been recently promoted.

Gentlemen, I ask you to think of the situation, because this is the situation that will arise if you place 250 men in command of one man.

PART II.

THE ADMINISTRATIVE AND TRAINING ASPECT OF THE QUESTION.

I have endeavoured up to this point to discuss the advantages and disadvantages of both systems solely from a tactical point of view with mobilized battalions at war strength.

I now intend to discuss the present system as we know it to-day in peace. I find in reading through the papers of those officers who have written on the subject of our organization, that the question from the point of view of the British battalion in India and the Colonies is barely touched on, and that in their endeavour to convince their readers of the defects of our present organization they have quoted the state of affairs existing in our home battalions in peace. This, gentlemen, is not putting the case fairly and squarely before you. I think I have already said that we must, in endeavouring to come to a decision on this big question, consider every aspect of the case, and from everybody's point of view. The condition of things in our home battalions is undoubtedly unsatisfactory in many ways, but is this the case with our fine big battalions in India and the Colonies? Let us see.

Training and Administration in our Big Battalions Abroad.

The chief cause of unrest to-day is the want of men for training purposes, and the captain's poor command. But do we find this shortage abroad? I think not. At any rate, my own experience as a company officer in a battalion abroad in peace time does not bear out the argument of no men. Over and over again I have been on battalion parades with the companies standing 70 to 80 strong, and sometimes stronger. There was no word or outcry about want of men in those days, and every officer to whom I have turned for information respecting the conditions of soldiering in India and the Colonies has told me that there are plenty of men to-day, and fine men too. The captain has a big command and plenty of responsibility, the young officers are not merely onlookers, but command men and share responsibility. And I wish to impress on you that we have battalions in India and the Colonies, representing a total force of 120,000

men and it behoves us to think twice before breaking up the organization of this magnificent body of men.

The Training and Administration of the Eight Company System at Home in Peace.

THE WANT OF MEN.

Now we come to the burning problem of the whole subject. I agree with General Maxse, with Captain G. J. Scovell, and with Captain Hereward Wake, that the want of men in the ranks to-day during the training season is a drawback to our Home Army. I agree that there are, at the period of the year we select for our company training, and at the time of the day when the majority of captains look for their men, few men for them to train. I go further, and say that if the tenets and principles of our manuals, and especially the Manual of Infantry Training—that book which, to quote General Maxse's own words "breathes the true spirit of British infantry"—were adhered to as they should be, there would be fewer men still. Gentlemen, we only raise our companies to a strength of 50 or 60 men during the company training period by disregarding every principle which the General Staff in our manuals tells us must be rigidly observed if the preparation of our young soldiers for war is to be carried out on the progressive individual system. And this fact is, in my opinion, largely responsible for the very unsatisfactory nature of the progressive training of the recruit in our home battalions to-day. No attempt is made to distinguish between progressive individual and progressive collective training so far as concerns the men, who are in their first twelve months' service and who are serving what must be the most serious period in a soldier's peace training, viz., the period of apprenticeship to soldiering.

But you may say in answer to this that there would be still fewer men for company training if we did not place raw recruits in the ranks for the purpose. And in reply I say this, "Yes, as long as we continue to train our companies at a time of the year which is notoriously the most inconvenient of all times, and as long as we retain this voluntary system of enlistment so long will our home battalions continue to be in a more or less unsatisfactory state compared with the armies of Foreign Powers."

How can we remedy this condition of things? Can we do so if we change our organization from eight to four companies? I do not think so, for though we shall change the name of our organization we shall still retain in the midst of it the ills to which I have just referred. Then how shall we get a satisfactory system of training in our home battalions? I cannot tell you in detail, what I advocate in the place of what we have to-day, simply because there is not time to do so, but I have

drawn up a number of questions [1] which open up subjects of the greatest importance, and which, if discussed fully at a round table conference of regimental and staff officers, would, I feel convinced, clear the atmosphere of much uncertainty with regard to the system of training, and very materially improve the existing order of things.

The Training and Administration of the Four Company Battalion at Home in Peace.

But what of the four company system? Glance please at the peace strength of a company in General Maxse's scheme.

Major.	Capt.	Subalterns.	Col.-Sergt.	Q.M.S.	Sergts.	Corps.	Privates.
1	1	4	1	1	4	17	124

Now even if the major of the company would really have this number of privates on parade I do not admit that he has any more men than the senior company commander, to whom is given another company to train with. But this major commanding this so-called fine big company will have nothing like 124 privates in his ranks.

The fact has, I think, been overlooked that in spite of the formation of a headquarter section to take all the specialists, such as recruit instructors, signallers, machine-gun sections, etc., there will still be a considerable wastage, and I enumerate here what the extent of that wastage is likely to be:—

		In each big Company.
(a)	Recruits serving their apprenticeship	22
(b)	Daily wastage, *e.g.*, sick, absentees, leave command, etc., ...	6
(c)	Men in training for the purposes of filling vacancies in the special departments, *e.g.*, signallers, machine-gun section, transport, etc.	8
(d)	Cooks	4
(e)	Officers' servants (including major's groom) ...	7
	Total ...	47

This number deducted from 124 gives us a total of 77 privates, and I have only included in the above table, what perhaps may be described as normal or chronic wastage—I make no mention of wastage due to men being ordered to the Mounted Infantry School, nor have I referred to the wastage in officers and non-commissioned officers, which we company

[1] I am unable, owing to want of space, to refer to these questions here: but I shall be pleased to send to any officer who is interested in this matter a paper embracing the points which I have drawn up for consideration, and which in my opinion should, before any change of organization takes place, be very fully considered.—R. J. K.

officers are constantly confronted with—and I ask you to examine for a brief moment this organization, which some officers would like to give us.

In the first place the 77 privates will be commanded by a major, mounted, and a captain—not a very great command for two officers whose combined service may total at the least 27 years, and possibly 35. Then again, each subaltern will command 19 men, assisted by a sergeant, and, finally, a full corporal's command will be no less than five men in three of the squads and four men in the fourth! Gentlemen, I submit to you that although our eight company system, as at present administered, provides no more men and has just the same disadvantages as those I have enumerated above, still the introduction of the four company battalion will leave us in peace just as we are so far as concerns the want of men, and on this account alone there can be no justification for the change.

The Position of the Four Junior Captains.

All will, I am sure, agree with me, when I submit that the most prized possession a young infantry captain has to-day is his company. To him it means everything, and all those regimental officers, who as subalterns have had to wait for ten or eleven years for their companies will be at one with me, when I speak of the intense feeling of satisfaction that comes to the senior lieutenant on being promoted to the command of his company. In a way a new phase of regimental life presents itself, and with it an added interest in things generally. If this change is brought about then your regimental officers who to-day serve nine or ten years before attaining a position of responsibility, will in future have to wait until they have 15 and 16 years' service, and they will be middle-aged men before they are given the smallest particle of responsibility. And here is a most important point that must be reckoned with: as we increase in years we increase in experience, and our characters take living shape; we form our own ideas on questions of professional import that daily arise, and we are consequently less able to sink our own individuality. As our system stands to-day we succeed, after ten years of subordination, to a position which gives us independence of thought and action, so far as the command of our companies is concerned. If you introduce this four company system you are imposing a further period of five or six years of irresponsibility on the regimental officer, and you are asking him to play second string to a man with whom he may have little in common, and with whose ideas on subjects of professional interest he may consequently be at variance. Now I put this question to you, "Is it just to the young regimental officer of ten or eleven years' service to say to him at the moment he is expecting to get a definite command, 'You must wait for another five years'?"

Personally, I think it an impolitic course to adopt. It has been urged that the junior captain will have ample opportunities of exercising his powers of command and of assuming responsibility, when his company commander is away on extra regimental employment of a temporary nature. But this fact only accentuates the extremely unsatisfactory position of the junior captain. The Commanding Officer of a battalion must fix the responsibility for the efficient or inefficient state of his companies on some individual; this individual can only be the company commander. It makes no difference whether that commander is continually present soldiering with his company or away on temporary jobs—the junior captain's position is identically the same, as far as the responsibility for the efficiency or inefficiency of the company is concerned—he must, if his commander is present, play the rôle of the spectator, or if he is absent carry on on the lines laid down by his commander, whether he approves of those lines or not, and so I say cases of a very unsatisfactory nature must arise if two officers of formed opinions and ideas on matters of professional interest are placed in command of one company. In no other army in the world, except Russia, will you find such a state of affairs, and why we should wish to introduce this system of dual control is not clear to many of us. Some officers state that the big company system has already been tried in certain of our commands. They say that it has worked well, and that the junior captains have not been heard to raise their voices against it. But is this so? First hand evidence is the most convincing of all evidence, and I can only say that the first hand evidence that has come to me from officers in those battalions at present organized as four company battalions, points to a preponderance of opinion against that organization. But I also add this to my statement: "Silence often expresses loyalty"; and it may be that the reason why no voice has been heard against the four company organization in those battalions in which it is being given a trial, is that the officers mostly affected, viz., the junior captains, are too loyal to express their true opinions openly.

Then again, to those who state that the system has already worked satisfactorily and with no loss of prestige to the junior captain, I say this—the junior captain has been fully aware of the fact that his loss of independence has been only of a temporary nature; that immediately the parade has terminated his company is restored to him, and that the hundred and one questions that arise in connection with the command of his men in barracks, are his and his alone. He knows this the whole time, and he is consequently prepared to take a subordinate position temporarily. But once destroy his interest, and you will do so if you deprive him of a definite command, and you aim at the same time yet another severe blow at the position and prospects of the regimental officer, and I maintain that we cannot, in these days, afford to adopt any measures likely to depreciate his prospects.

Before I leave this question I desire to clear up a point concerning which there seems to be some misunderstanding. It has been said, when discussing the position of the junior captain, that after all the officers exist for the Army and not the Army for the officers, and that if the change is in the interests of the Army, the officers ought not to allow their own personal interests to influence them against it.

I think perhaps that those who have given utterance to these statements forget that we regimental officers live for the Army, and that we are full of loyalty and patriotism, and all we ask is that our views on matters that concern us vitally, and concerning which we are able from a long study of the conditions, to give an opinion, be taken into consideration when deciding on an issue of this magnitude.

And with this I leave this part of the discussion and turn to what I term the psychology of the matter in debate.

The Psychological Side of the Question.

How will this change affect the men and their relations with their officers? What is, first of all, the state of affairs in our present organization? I have already referred to the intimacy of comradeship, that must inevitably spring up in the small company system, owing to the fact that a company commander can become intimately acquainted with every man in his company. Earlier in this paper I have pointed out the importance of this, and it is of such import to the well being of the men in peace, that in the absence of this intimacy of comradeship, which as a result of intercourse at work and play, springs up between officers and men, I have no hesitation in saying that not only in peace will the lot of the men be considerably altered for the worse, but in war this failure on the part of the officers to know their men intimately in peace may lead to disastrous results. And I say this—if you increase the companies to-day to 250 of all ranks and place two officers in command, not only will neither know their men intimately, but what is of equal importance, the subalterns, each of whom may suddenly in war be called upon to take command of the company will be in a like predicament, so far as knowledge of the whole company is concerned. To-day we captains know every man intimately—if we do not then we ought to—and we train up our subalterns on the same lines, and from this fact alone emanates a magnificent esprit-de-company leading to that esprit-de-corps which is the proud possession of the British Army.

I beg of you to pause before you introduce a system that will totally destroy it.

The Organization of the Infantry of France and Germany.

I only refer to the Infantry of these two nations because of the interesting relationship existing. In both cases the company is in the hands of one commander, viz., the captain,

and under him are four lieutenants, one to each section with the complete number of under-officers and non-commissioned officers that is considered necessary for the training of the men.

There is no question of a dual control, and I mention this point because those who advocate the same quote as one of the principal reasons in its favour the organization in this respect of the companies of the foreign armies. I have used the argument that our organization has never failed us in war, and in answer to this we are told that the four company system did not fail the Germans in the 1870 campaign. But then ours is the better argument, because our Army has been quite recently engaged in war under modern conditions and with modern weapons; whereas neither the Germans or the French have put their organization to the test of modern warfare; and moreover it is no answer to the statement put forward that their organization and training may be faulty to say that both withstood the ordeal of a war fought over 40 years ago with obsolete weapons between an Army led by an highly organized staff on one side, and an Army without a staff on the other.

Then again it was the introduction of universal service in Prussia that led to the introduction of the big companies, for when universal service came in the peace strength of battalions was reduced to 500 rank and file, leaving the companies only 60 strong. *And with the introduction of the big companies came the reduction of exactly one half of the officers on the active list and the saving of the pay of four captains and eight subalterns in each battalion.* I ask those who would reform our organization to give this point their most earnest consideration.

Another point I must refer to: the battalions of the French and German Armies are service units and nothing else, whereas our home battalions are both service units and training depôts for the foreign battalions. And if you will accept the cardinal maxim that the same unit cannot be a service unit and a training depôt for troops at one and the same time you will see the impossibility of attempting to draw any comparison between our Army and the Armies of France and Germany.

Before I leave this question of the customs of the foreign Powers I have to make an appeal to you, and it is this: Our Army is small in numbers, but over and over again we are told that what there is of it could not be beat. We are directed by an able and sympathetic Imperial General Staff, we are officered by a magnificent body of regimental officers, who in turn are looked up to, respected and followed by a magnificent body of men. Must we be constantly turning to those of other nations for advice? Cannot we, as General H. Wilson recently said in this Institution, "Strike out our own line of thought in these matters and stick to it." I suggest, gentlemen, that this is not only possible, but that it is our duty to do so. In any case before we definitely decide to adopt the German organization let me read you an extract from a report on the German Army

manœuvres of 1911: this report was written by the military correspondent of the *Times*, who only recently was referred to by the present War Minister in the House of Lords, as one of the greatest military authorities of the age. Speaking generally of the Army he says, "The German Army appears to the writer to have trained itself stale. Year in, year out, the same ceaseless round of intensive training has reduced the whole Army to a machine, by which individuality, initiative, and freshness have been vigorously crushed out. The effort to create initiative by regulation has not succeeded. The training of the year, always the same, has become a form of somnambulism. Everybody does the same thing every hour of every day every year, *and officers who have to wait 16 or 17 years for their companies are spent and tired long before they rise to high command.* The majority of senior regimental officers do not possess the physical qualifications necessary for effective service during the arduous strain of the infantry fight, and until the cadres are rejuvenated the conditions will remain unaltered."

Must we mould our organization on these lines?

The Changes in the Cavalry in 1892 as compared with the Proposed Changes in the Infantry To-day.

I now wish to refer to the squadron system in the cavalry and to the arguments that have been used in regard to it in part justification for this change. Sir John French stated in this Institution a short time ago that although possibly the changes in the cavalry organization in 1892 were not on all fours with the proposals brought forward to-day, still he well remembered the opposition that the proposals to substitute the squadron system for the troop system met with. The Duke of Cambridge, himself an opponent of the squadron system, in response to the request of several cavalry officers allowed the experiment to be tried in the case of one or two regiments some time before the change actually took place. This experiment failed for the following reasons:—

(a) The Duke himself was opposed to it.
(b) The troop commanders paid large sums for their commissions, and it was thought impolitic and unjust to lower the status of half of them.

A few years later the change was actually brought about and met with little or no opposition, simply because the whole Army wanted it, and it was thought unwise to defer the measure any longer. I now come to the interesting part of this discussion—what was the system in those days? First of all the organization of the troop before the change, here it is:—

	Officers.	N.C.O.'s	Privates.
Cavalry troop, 1891	1 major or captain 3 subalterns	4	48

and now the organization of the Infantry company to-day:—

	Officers.	N.C.O.'s	Privates.
Infantry Company 1912	1 major or captain 1 or 2 subalterns	8	79

The troop leader's command was a ridiculous one, and I can quite understand the ridiculousness of the position. If my command was no more than 50 odd men I should not be addressing you to-day, and asking you to retain our present organization.

Now let us glance at the training and the interior economy of the cavalry troops in those days. First of all I instance the case of the foreign squadrons. Germany, France, and all the leading European Armies made their squadron the administrative as well as the tactical sub unit. But our cavalry system in 1891 had two separate organizations, one for administrative purposes and interior economy, and the other for tactical purposes; to put it to you more clearly, the troop commander had complete control of his troop of 48 men when inside the barrack walls, but immediately the troop emerged for tactical work or field training, it was merged with another troop into one squadron and placed under the senior troop commander of the two. In other words the British Army combined the squadron unit for tactical purposes with the troop sub unit for administration, and in so doing violated the first canon of successful leadership, *viz.*, that the officer who commands in quarters should also command in the field. This arrangement must have been a most unsatisfactory one, and I can fully appreciate the necessity for the change. But in our infantry companies the captain is paramount in quarters and in the field; the two situations therefore again in no way resemble each other. Before leaving this subject I desire to mention the position of the captain or the second in command in the squadron as it exists to-day, and to compare the situation with the second in command of the four company organization. In the first place the responsibilities devolving on the shoulders of our squadron officers are very much greater than those assigned to us in the infantry; not only is there a man to be trained, but a horse as well; in the case of the man he has to be taught the use of two weapons, and in some cases three; he has also to be taught equitation and all that appertains to it, and all this in addition to the attainment of a very high standard in other professional work. Then again, there are the remounts to be trained and got fit for the ranks, and if we put the value of each horse in a squadron at £40, we find that there is the responsibility of a sum of nearly £6,000 in horse flesh alone resting on someone's shoulders; and if to this we add the arms, saddlery and equipment of each man the total value of Government property at stake in a squadron does not fall far short of £10,000. And on whom is this responsibility to devolve?

Nominally on the squadron commander, but our organization allows him a second in command to share this responsibility.

Now for the responsibility and work of an infantry commander in the four company system. He will be given 72 privates to train, and he will be given the responsibility of 124 sets of equipment, the pecuniary value of this responsibility amounting to £1,000 at the very outside. And who will he have to help him in this laborious task? A second in command in the shape of an officer of perhaps 10, 11, 12, 13, or 14 years' service. Gentlemen, what a glorious time these two hard-worked officers will have!

And my last point in regard to this question is the comparative ages and services of the second-in-commands of the squadron and of the company in the four company system. Promotion is very quick in the cavalry, and officers frequently get their promotion from lieutenant to captain in five or six years, and to major in 12 and 13 years; whereas in the infantry lieutenants often have to serve for 10, 11, and 12 years before promotion comes to them; and so the age and service at which the cavalry captain is attaining to the command of a squadron may often be the age and service at which, in the infantry, the lieutenant is being promoted, not to a position of complete responsibility as in the cavalry, but to a position in which he must sink all his individuality and become subordinate to his company commander. No. I can assure you that the two questions are totally and completely dissimilar.

A Retrospect.

Now, what are the conclusions we come to from this discussion? I have endeavoured to prove to you that the four company system has few if any advantages over the eight company system. I have endeavoured to point out to you that the change is not desired by a very great number of both Staff and regimental officers, and I have made it my aim and object to show you that these officers are not averse to the change simply because it is a change, but because they one and all believe with sincerity that this change will not effect any real reform. We have in the last generation been subject to many reforms, many of which have brought benefits to the personnel or increased the war efficiency of our Army. Many of those officers who have stood out prominently in promoting these measures of reform have to-day equally prominently identified themselves in the movement against this change in our infantry organization; and I am quite prepared to admit that many of those officers, who desire this change, have been equally prominent in identifying themselves with those other great measures to which I have referred. But the hard fact remains that on the side of those who deprecate the change, are to be found many of the most up-to-date soldiers and hardened reformers of the day, and I therefore ask those of you who are in the other

camp not to attribute to us a desire to throw out this proposal simply because you have the impression that we as a body are opposed to changes or reform of any kind. The presence of our Chairman to-day is in itself an answer to that impression. A well-known military authority recently gave utterance to the words "For Heaven's sake leave the Army alone and give it rest for a while;" and when, in my very humble opinion, some of the changes advocated appear to me to endanger our efficiency, I sometimes feel inclined to reiterate that cry. My entreaty to you in this particular controversy is to leave us alone; let us work out the training of our men in our home battalions on the lines laid down by our General Staff, and if there are from time to time plaints from officers that our systems are unsatisfactory, let these plaints form the subject of a round table conference; and then if it can be proved that our systems are defective, and that we can improve on them, I say from the bottom of my heart "Let us do so." But before we depreciate, let alone scrap any of our cherished traditions, let us see that in so doing so we are acting in the best interests of the arm affected.

DISCUSSION.

Colonel H. C. Ruggles-Brise, M.V.O., Commandant School of Musketry, said that having trained his battalion in four companies and also in eight, he was in agreement with the views put forward by the Lecturer. Nor could he understand whence this demand for a four company organization sprang. As a student of the '70 war, he sat at the feet of Sir Lonsdale Hale and Colonel Henderson, and, so far as battalion organization went, the German infantry was not a model for them to imitate. Again, neither during the Boer War, nor after, had there any fault been found with the eight company system. In fact, out of the many Generals who gave their views to the War Commission, there had only been one who advocated a four company organization, and the reason given was that he had been in favour of it all his life. In his (the speaker's) opinion the demand for the change came from the greater keenness of their regimental officers, coupled with a too low peace establishment of their infantry battalions. In fact, at present, there were not enough men in their battalions to do the work required, and there was a great loss of training power.

In conclusion he thought that, as the arguments for the change arose solely from experiences in peace and not from those of war, any such change was much to be deprecated.

General E. H. Clive: It is about 40 years or more since the German successes in 1866 and 1870 led soldiers to consider whether these were due to their battalion organization in four large companies, and whether the large company was better in attack than the small one. After the best consideration it seemed to me that the large company gave more precision to the direction of the attack, and more power of control when the attack was in progress; also that the mixing of men of different companies was deferred as long as possible.

This Institution kindly lent me the use of this theatre for some lectures on the subject, and at the last of these Field Marshal Lord

Wolseley took the chair, and summed up strongly in favour of the small company, and against my view. Thirty years elapsed. Every ten of them saw the range of the rifle increased; the rifle improved, and the marksmanship of the soldiers grown more accurate; and in 1899 we found ourselves committed to a war in South Africa, a large open country, eminently suited to a defence by rifle fire, and occupied by a people familiar with the use of the rifle from their youth up.

It seemed to me that the time had at last come when the small company was to be tried in the attack of a position against modern rifle fire, and I was anxious to ascertain how a long, weak, wavy firing line, with wide lateral extensions would deal with a determined attack on a position, and how such a line could be directed and controlled. Opportunities were frequent. Officers returning wounded from Magersfontein informed me that once the attack was slipped all control ceased; that in the company many were out of hearing of the captain, some out of sight; that the captain, when it seemed good to him, advanced; the files near him conformed; the others did the same, and the companies on the flanks were free to act as they pleased.

This confirmed me in my opinion that the large company is the best organization for attack. I am glad that General Maxse has brought the matter up, and that experiments have been tried at Aldershot. The soldier's duty to his country is to fight for it; and the country's duty to the soldier is to provide him with the best arm, ammunition and equipment, and an organization for attack which will enable him to come to grips with his enemy with the maximum chances of success, and with the minimum chances of failure; and the last, in my opinion, is afforded by the big company.

Colonel The Hon. E. Stuart-Wortley, C.B., C.M.G., M.V.O., D.S.O., said that he was reminded of the views held by the late Commander-in-Chief, H.R.H. the Duke of Cambridge, which were, that he was averse to changes for changes sake; but if the changes were shown to be necessary for the welfare of the Army, he was the first to agree to them. So far as he could judge from the reasons put forward he could not see that any sufficient grounds existed for such a radical change in our battalion organization, as from an eight company to a four company establishment. The organization of foreign armies was, he considered, not at all applicable to our Army—the former being recruited on a basis of conscription, and the latter on a voluntary system. The German Army was nothing but a huge machine ruled by hard and fast regulations; without any encouragement of initiative; while ours was trained to encourage initiative in such a manner that officers and men would be able to act on occasions in a manner for which regulations did not provide. The great danger of the introduction of four company battalions would be that, in the future, some Minister of War might reduce the number of officers in the peace establishment, and such a step would be found to be fatal on mobilization. The first ambition of a young officer was to command a company; under a four company organization he could not become a company commander before at least 16 years' service. As a half company commander he would have no actual responsibility.

As a Brigadier, he (the speaker) would much prefer to command a brigade composed of four battalions, each of eight companies; two companies could always be used as one if necessary; but one company, at war strength, when the officers and men were well known to each other, and formed a complete and thoroughly organized unit, was of infinitely

more value than a company of double the strength, of which more than half would be reservists. It must always be remembered that, although a battalion was not made for the officers, it was the officers that made a battalion. He agreed thoroughly with the views of the Lecturer; and trusted sincerely that no such radical change would be made in their time-honoured organizations, unless overwhelming reasons were adduced in favour of it.

Brig.-General H. De B. de Lisle, C.B., D.S.O., Commanding Second Cavalry Brigade: The Lecturer has presented the question from the point of view of the regimental officer, and we have listened to him with the greatest interest from the fact that he has, in every station in which he has served, established a great reputation as a regimental officer.

I wish, however, to put forward two points in favour of the four company battalion. I think it most important that young officers, as soon as dismissed recruit training, should be given a definite command, for which they are responsible. In spite of what the Lecturer has said, I do not consider the supervision of a half company a definite command, for at present a lieutenant is not responsible for the training of a unit, as is the case in a squadron or a battery. From the first, officers require to learn habits of command, and system in training.

The second point, which I admit is open to argument, is that with four companies a higher tactical ability on the part of company commanders will be demanded, and this infers selection. At present an officer succeeds to the command of a company by seniority alone, provided he has passed the usual test for promotion. I think that something will henceforth be required from officers before appointing them to command 250 men, or one quarter of a battalion; and this means selection. Selection may be unpopular among regimental officers, but we must admit selection promotes higher tactical ability and keenness, and tends towards increased efficiency.

Colonel Lord Raglan, C.B., said that as, during his command, his militia regiment had been reorganized into double companies, he had had experience of the advantages of large companies, at any rate, as regards administration and interior economy. As regards the commanding officer, he had only four units to deal with instead of eight, and his companies were commanded at all times by officers of experience. The officers commanding companies had units which made a respectable command, and with which really useful work could be done. If for any reason they were away, the officers they left in charge must always be of standing and experience. The captain should occupy the same position as that of the first lieutenant in the Navy, *i.e.*, second in command and adjutant. The subalterns had, from the moment they joined, a distinct and appreciable unit to command, for which they were responsible, and which must train them to better habits than the present haphazard system. They would be in the same position as subalterns of artillery or cavalry. But where the system worked so well was as regards the N.C.O.'s. At present an infantry battalion had to produce eight Admirable Crichtons as colour sergeants. They must be good disciplinarians, good drills and accurate accountants. It was not often that all three qualities were found in one man. Under the four company system it was only necessary to find four drill and disciplinarians for company sergeant majors, and four accountants for company quarter-master-sergeants.

The enormous advantage of having a special N.C.O. who could be left off parade to devote his attentions to the pay and mess sheet, the

messing and the barrack rooms, had only to be tried to be appreciated. If the pay of these N.C.O.'s was the same it made little or no difference which was senior, and promotion could be given in accordance with special qualifications. The sergeants were given distinct sections for which they were responsible, and with which they always worked, and even the arrangements in camp were vastly improved by having the tents of each company in five lines, a section in each of the first four, and, in the fifth line, the company sergeant major, the company quarter-master-sergeant and a company store tent. The sole objection to the scheme was the somewhat unwieldy size of companies at war strength. This was a fault which cured itself rapidly in war, and to his mind was not sufficient to outweigh all the other advantages.

The company should have its own store, and be an accounting unit; it should have its own orderly-room tent, and in fact, be self-contained and self-sufficient.

Major B. C. Green, London Scottish, said that as a Territorial officer, he was unable to speak of how the contemplated change of battalion organization would affect the Regular Army, but he should like to say a few words upon the subject from a Territorial standpoint, in case it might be thought necessary to introduce the four company system into the Force.

In the first place, the Territorial Army of this country was solely and entirely a force intended to take the place of regular troops for the defence of these shores, should the Expeditionary Force be called away over seas. As such it was never likely to be called upon to fight outside the limits of Great Britain. The first point, in connection with this country, was: that no matter how beneficial the double company organization might be in countries like South Africa and many parts of the Continent of Europe, yet in an enclosed hedge-row country like England the handling of double companies would be far more difficult than with their present small company system, and proper control would become an impossibility. For the defence of this country he was of opinion that the smaller the tactical unit the better the control. It was common knowledge that in action, after instructions had been given to all units, when the attack had been launched, and the troops had come under effective fire of the enemy, the battalion commander had very little to say in the matter, the whole success of the undertaking rested with the captains, subalterns, section commanders, and squad leaders carrying out their instructions, and control rested almost entirely upon these officers over the men in their immediate vicinity. Officers could not be mounted in the firing line, and a major without a horse would be of very little use in the control of any length of section in a firing line. In a hedge-row country all these difficulties were magnified. General Maxse had laid stress on the fact that in the Regular Army the company organization was always incomplete before mobilization, and that upon mobilization company commanders would have subaltern officers, N.C.O.'s and men whom they had never seen before, and of whose worth they were totally ignorant. With the Territorial Force, this state of things did not exist, and under present conditions it was impossible. Even if the Territorial Force was up to full strength, which he feared it never would be, as at present constituted, the most optimistic critics asserted that at least six months' training after mobilization would be necessary before it was fit to take the field, so that ample time and opportunity would be given for all ranks to know each other.

Difficulties Peculiar to the Territorials.

Then they must consider the point of the country battalions whose companies were often many miles apart. Many of the men had to travel miles for drill, and there were very few instances of such companies being up to full strength, either in officers or men. If the establishment of their companies was doubled, the existing difficulties would be enormously increased.

Then, again, there was the matter of accommodation; many Territorial headquarters did not contain drill halls large enough for the proper training of even a small company and this difficulty would be increased with double companies, for it must be remembered that a large proportion of Territorial drill must be carried out in drill halls at night. Another point which he considered a very important one, though it might be a more or less sentimental one, was that nearly every Territorial battalion had its company traditions, which had a very important bearing upon the training of the battalion. A healthy rivalry existed between companies both in drill and musketry. If the double company system were adopted half of these traditions would disappear.

He thought he had said sufficient to show that he did not think the new scheme would work efficiently or be an improvement upon the existing one in the Territorial Force.

Major-General Sir T. Fraser, K.C.B.: This fine meeting, chiefly composed of company officers of infantry, is a gratifying fulfilment of the unanimous desire of the Council of this Institution that the younger officers, on whom our hopes for the future depend, should come here and express their views on important questions of the day, about which many of them are among the most competent expert witnesses, and I congratulate the Lecturer, both upon his audience and on the ability with which he has put forward his views; views for which there is much to be said, as there is also for those he endeavours to controvert.

With the exception of the Anglo-Saxon races the military world at large—the small nations as well as the great—have adopted the principle of the "Nation in Arms," and with it, that of the four company battalion. Of the great military Powers, most have had a national experience of war on a much wider scale than has fallen to us. And the cumulative weight of their united decision should not be lightly rejected, for the balance of probability is against our being right, though, admittedly, our world requirements are unique and exceptional, outside Europe.

Changes due to the Breech-Loading Rifle.

The question of to-day, however, is the internal organization of the battalion. The Lecturer has ably advocated the merits of the eight company system, and I should be the first to object to a change which would involve any reduction of the numbers of company officers in the battalion. The military revolution that forced itself on the world in 1870-71 was due to the introduction of the breech-loader; it made a complete change of formations imperative, though Wellington, with his riflemen in the Peninsula, had in a measure anticipated it.

The change was all in the direction of greater extent of frontage in proportion to numbers, and, at the same time, to greater depth in the disposition of the immediate supports and reserves. In 1870-71 the volume of musketry fire was at least fifteen-fold what it had been with the muzzle-loading musket; and the area over which that fire extended its influence, was also some 15 times as great as before.

At present, with the greater rapidity of fire from magazine rifles with smokeless powder, with smaller bores—and consequently more rounds on the man—and also with a much flatter trajectory, the fire potentiality of a company unit of 225 men is probably eight times as great as that of a battalion of 1,000 men armed with the old smooth bore; though, of course, when it comes to the bayonet, the value of numbers is not changed.

Just as a field officer was necessary when a battalion was fought by word of command, so I think one is necessary with the company unit of 225 men, both on the ground of its greatly superior fire power, and also of its greater extension of frontage and of depth from front to rear. The only difference would be that one of the captains of the small companies forming the larger company, would, if qualified for selection, be a major. We gain in giving the weight of rank to the best captains.

It is a great advantage to a unit such as the large company, to have its own supports and reserves distributed in depth behind it, and under its own senior officer, whose duty would then be to keep on reinforcing and feeding the firing line, till at last he would bring up the reserve into that line, and strike with the whole force of his company. A company of 100 men is too small a unit to be broken up into firing line supports and reserves, and, at present, it has to depend on the support of another company. We are right to train men to face the inevitable disorder inseparable from the attack, but that is no reason for not adopting the arrangement that is most likely to minimize it. Besides this, the large company, with its field officer, is a convenient, complete unit to detach where a half battalion is not required, or cannot be spared.

I could not help thinking also that the Lecturer is obsessed with the idea that the whole of the big company comes at once into the firing line. That is not the Continental view, as I understand it. He is also a little pessimistic about any field officer being able to walk a mile, under existing conditions of attack. The mile that the firing line has to crawl over, provides an occasion in which youth has its finest opportunities, but the supports and reserves cannot fire, even if they wanted to do so, so their advance is comparatively easy. I am sure that the gallant Lecturer, some ten or even 20 years hence, and without, I trust, a single grey hair in his head, to shake his self-confidence, will feel that, with a fight in front, men are rare who could not cover the mile, particularly when they have ridden to the action while others walked.

I am not concerned with the advantage which the large company offers, of tiding over the grave difficulty of peace training, due to our present system; because, if we reject the wisdom of the rest of the world and fail to make ourselves "a Nation in arms," trained all on one system, our doom is assured. When that great change comes, as come it must, the causes that led the present "Nations in arms" to adopt the four company system will be alike insistent with us, and a change now would save a change in the future, should the competent authorities old and young, agree that it is the better system, as on the whole I venture to think it is.

Colonel R. Whigham, D.S.O. (General Staff, War Office), said that there was one point in the tactical aspect of this controversy which, so far as he had noticed, had not been referred to.

That point was the relative value of the small and large companies in night operations. Everyone who had studied the Manchurian campaign, and particularly the ten days' battle on the Sha-Ho, where night

attacks were the rule rather than the exception, must be impressed with the importance of simplicity and facility of control in the formations to be adopted in carrying out a night advance or night assault. There was also on these occasions greater need than ever for the direct influence and control of the company commander, in view of the assault with the bayonet which was the climax of all infantry tactics, particularly so in the case of night operations. Did not these considerations point to the superiority of the small company?

Then there was the question of more horses for infantry officers. Personally he was inclined to think that too much stress was laid on this point in regard to the battalion in the attack. Sir T. Fraser had just said that when the large company was deployed in action it would be commanded by a major, that was to say by a field officer, and that he thought it a great thing for it to be controlled by a field officer. With all respect to Sir Thomas, he did not think the "field officer," as such, would make any difference because he would be deprived of his horse as soon as the bullets made it necessary for the company to deploy. And a field officer on his feet had no advantages over a mere captain who knew his business. They need go no further back than the South African War to reassure themselves that captains of only ten years' service were no whit inferior in handling their companies under fire to those whose service was nearly double. They must all agree that the larger the number of company commanders who could be mounted during the preliminary stages of an action the better, and it was for this reason that provision was made in war establishments for mounting two of the eight company commanders; but, once the bullets began to fly, the horse was rather an encumbrance than otherwise.

Chain of Command and Cohesion in Battle.

He would like to say a few words about the improved chain of command and the gain in cohesion claimed for this system by the advocates of the large companies. They made a great point of the importance of the company commander dealing direct with his "sections," *because the "section" was the normal fire-unit.* This statement was literally correct as a quotation from "Infantry Training," but the "section" referred to was our present section of 25 rifles controlled by a sergeant. Let us get away from this fog of nomenclature, and get down to facts. In the four company scheme the company commander was to deal with a subaltern who commanded 50 men. That was precisely what happened with the present system, and he failed to see why changing the name of the subaltern's command from "half company" to "section" should of itself be an adequate reason for doubling the numerical strength of the "normal fire-unit."

He had argued out with himself the relative advantages of the two systems as regards control under fire, that was to say, the problem of intercommunication and transmission of orders, and there did not seem to be very much in it. The four company system might be rather better adapted to maintenance of cohesion in an attack, but to his mind this was more than compensated for by the greater elasticity and flexibility of the eight companies. The latter system was surely superior when providing protective detachments. With the four companies they would be limited to detachments of a quarter or half the battalion, unless a company was broken up. One quarter was often too little, while a half was too much. One third, or three companies out of eight, would frequently be found a very convenient allotment when furnishing outposts.

But, as he had just said, when speaking of night operations, the prime factor, to his mind, was the influence of the company commander on the men in the ranks when it came to the moment for the bayonet assault. It stood to reason that this influence would be intensified in the case of the eight company battalion.

Chain of Command and Administration in Peace.

He would add one word about the administration of the small company in peace. There was no doubt that, owing to the weakness of the home establishment of subaltern officers and N.C.O.'s, there were great difficulties in the way of giving either young officers or N.C.O.'s "definite jobs." But they would exist no less under the other system. If the peace establishment of officers and N.C.O.'s were raised to the war establishment the problem would be comparatively easy, for few would deny that, if a young officer were given the whole responsibility for training the N.C.O.'s who were to command the sections and squads which he was to control on the battlefield, he would have a sufficiently definite and onerous task, even if the sections themselves were numerically weak. They must hope, then, that the discussions on this controversy of the four or eight companies would convince the authorities of the necessity for an increase in the peace establishment. In the meanwhile the best arrangement they could make under existing conditions was as follows, taking the case of a company with only one subaltern :—The captain must at all costs establish and maintain the frame-work of his company, that was to say the four sections. If sergeants were not available as section commanders he must put corporals or lance-corporals in their place.

Then to his single subaltern he must hand over the right half company. As regards the left half company, he could say to his senior sergeant, "You are now in the position in which you would be in war if the subaltern commanding the left half company were to become a casualty; so far as I can I intend to administer the left half company through you, both in barracks and in the field."

That was not an ideal solution, but it was the best they could do. That it could be done, and was done, he knew. That the adoption of the four company system would *of itself* enable them to do any better, he knew to be a fallacy. But however difficult the problem, let them trust the subaltern and give him his half company or his "section" for his own from the day he joins.

Captain A. C. Temperley, Norfolk Regiment, said he was much afraid that, when the four company system was weighed in the balance at Aldershot this year, much undeserved merit would be acquired for it because officers would see handy companies of 90 or 100 men handled by company commanders. The companies would, in fact, be about the strength of a full-sized company in an eight company battalion. The only proper test for the four company system was to see companies work at war strength, 250 strong. When he was in India his battalion experimented with the four company organization, and for six months he commanded a company of 250 men. At the end of the cold weather the captains unanimously reported unfavourably on the four company system. The companies were unwieldy, and command and control were difficult. He wished to emphasize Colonel Ruggles-Brise's remarks about the futility

of the present establishment. The advocates of the four company system talked about organizing for war, but in their hearts, they were thinking of training. They saw the present tiny companies and said, "Let us join two together to give one captain an adequate command, and then let us think out some arguments in favour of our plan." It all came back to the question of establishment. He would give a few facts. Between February, 1911, and February, 1912 his battalion sent 345 men abroad, and over 80 to the reserve. That was to say, out of an establishment of 777, which they never reached, they lost over 425 trained men in a year. In February, 1911, in his company he sent 29 trained soldiers abroad three weeks before his company training began. This year the men who had previously done a company training were largely outnumbered by those who had not. People talked about the difficulties of foreign officers who lost 50 per cent. of their men yearly, but their difficulties were a mere nothing as compared to those of the British officer.

Fifteen years ago their Army (except for the Aldershot Division) was unorganized, it was chiefly a nursery for foreign drafts, and no one knew what the Army was for, though some vague and nebulous ideas existed about scratch expeditions for small wars. To-day, their establishments had been reduced, and an Expeditionary Force had been created, which was to be capable of fighting in Western Europe for their existence as a first-class Power, even when largely outnumbered. And with a reduced establishment! He said deliberately that the dual rôle, for a battalion, of being a training depôt and a tactical unit, capable of expanding in three days into a service battalion fit to meet some of the best troops in Europe, was, with the present establishment, an impossibility. And such dodges as four-company systems, headquarter-sections, and the abolition of bands only touched the fringe of this great and vital question.

Colonel W. T. Dooner said that in his opinion—an opinion which he formed nearly 25 years ago—this matter of the organization of a battalion in four companies or in eight, was one which might be settled by a compromise, viz., that the battalions should remain as at present, in eight companies for administrative purposes, but when on parade or on manœuvres, or on active service—in fact for tactical purposes—the battalion should be formed in four large double companies under a major or the senior officer of the two companies. He considered that two advantages would be gained by forming a battalion into four companies for fighting purposes, first, that the command of each large company would be in the hands of a senior officer, and also that this command, when in action, would be in depth, not in breadth, and therefore more easily supervised and directed. He had always thought that, the plan at present laid down, of having the senior major in the fighting line, and in charge of it, was a mistake. General Maxse had well expressed it when he said in his lecture that the major probably attached himself to one of the centre companies, and either interfered with it, or did nothing at all. The front occupied by the firing line of a battalion varied in accordance with its strength, but it was generally 300 to 400 yards—General Maxse made it much more, nearly half a mile—but even a front of 300 to 400 yards could not be controlled by one officer when under fire, and the major—in his opinion—could be of no use whatever in the firing line in the first stages of an action; whereas, with four large companies, the front of the battalion, while remaining the same, would be formed of the quarter of each company extended, with its captain or major following with the support or

reserve, in a far better position to see and give his orders, and call on the men of the reserve when required.

Then his second point was that the mixture of companies by this arrangement of four companies per battalion was avoided as long as possible, as the firing line of each large double company was fed from its own support and reserve. Perhaps some of the officers who were in the numerous battles on the Tugela, or, like the Lecturer, at Talana, would inform them how the battalions were got together after an action, and whether the eight companies were generally all mixed up together. The Lecturer had stated that the Home battalions had two subalterns per company, but he thought he would find that he was in error. They ought to have two subaltern officers, but it was only the foreign battalions which had this number; and on Home Service 12 subalterns only were allowed for eight companies; a bad and half-hearted arrangement which averaged one-and-a-half subalterns to each company, instead of two, as stated by the Lecturer.

They were all agreed, he thought, that whatever happened with regard to this organization of a battalion, no reduction of officers should on any account take place; in fact, if the four company battalion was adopted, there would have to be an increase of four subalterns in Home battalions to make the companies efficient, so that each battalion would consist of a lieut.-colonel, four majors, four captains, and 16 subalterns—also an adjutant and quarter-master—but if this four company organization was decided on, he thought that the senior major, or second in command at present on the establishment, could be dispensed with, and that the expense of this officer would go towards balancing the extra money required for the increase of four subalterns per battalion; but there would also be an increase of expense by having each company commanded by a major instead of as at present, where some of them were commanded by captains, when the majors were absent on extra regimental employment. The four company battalion, to be efficient and complete in majors and other officers, would necessarily cause extra expense, but he hoped there was no one there that day who would argue that because some extra money was required, tactical considerations must give way, and inefficiency result. If a four company battalion was best for fighting purposes—as he ventured to suggest that it was—it should be adopted regardless of expense. If approved of, possibly the arrangement—as regards promotion—in force from 1881 onwards, for some years, should be reverted to, and all majors absent from their regiments on Staff or other employment should be seconded, and captains promoted in their places; whereas, at present, when a major was away from his regiment on duty a subaltern was promoted captain to replace him.

The speaker on his right (Major Green) had mentioned the Territorial Army, and had stated that four company battalions would be unsuitable or inapplicable to that force. He agreed with him. They had enough difficulty already with recruiting for the Territorials, and split up as they were into so many small detachments, the eight company organization must remain for administrative purposes. When, however, the battalions went into camp or had to fight to protect their hearths and homes, then the four company organization might be adopted, the senior officer taking command of each double company.

Major A. R. Burrowes, Royal Irish Fusiliers, said he was one of those who did not believe that the British infantry required reform in the

commonly accepted meaning of that word. They believed the present organization and the regulations and training manuals governing it to be so good that any change ought to be contemplated with extreme caution. One of the chief reasons for change set forth by the advocates of the four company system was the difficulty of training their Home battalions. They all knew how great those difficulties were, but in his experience they were not insuperable. The difficulties were those inherent in a voluntary system of enlistment, and would exist with the four company system. Difficulties did not occur in battalions on foreign service. He submitted that the only test worth primary consideration was that of war, and he would ask when had the eight company system failed them in war? They had had great experience and the system had not failed. On the other hand, the experience of Continental armies had taught them to envy the small tactical units of the British Army.

The Lecturer had asked for the experiences of regimental officers. Before the South African War, it was his (the speaker's) good fortune to serve abroad under a colonel who insisted on company organization being carried out thoroughly. During the war the results of the training under that organization had been, to use the words of Infantry Training, 1905, "Impossible to overrate." He could quote instances if required. A distinguished General had told him that he considered the command of an infantry company in the field the most difficult in the army. He, himself, had found it difficult in South Africa, which was an exceptionally open country. How much more difficult would it be to command a company double the size in an enclosed country. He did not think the case was analogous to that of a cavalry squadron, but he did believe the company commander's position would be analogous to that of a battalion commander, viz., he would only be able to exert influence so long as he had a portion of the company under his immediate command. War was the only test, and he would suggest that as many officers as possible who had commanded a company in war should be called upon for their opinions before seriously considering a change which would affect, not only Home battalions (which, as constituted in peace, never went to war), but also their foreign Army, the Indian Army, and those great Colonial Armies which formed such an important part of the Imperial Forces.

He had only one more thing to say. It was with great diffidence that they, as regimental officers, ventured to criticise a scheme which they knew had the approval of high military authority. He hoped that nobody would conclude from that, that they were "Agin the Government." The loyalty of the regimental officer had never failed, and it was not going to fail should this organization of four companies be adopted, however devoutly they might hope that such would not be the case.

Colonel F. S. Maude, C.M.G., D.S.O. (General Staff, 5th Division), said that General Pitcairn Campbell had been very anxious to state his views personally at this lecture, but, as he had found that it was not possible for him to be away from the Curragh at the present time, and as he (the speaker) happened to be passing through London on his way to Ireland, General Campbell had asked him to attend the lecture and speak for him that afternoon.

No doubt some of them were acquainted with General Campbell's views on the question, as he had already stated them in that theatre on the occasion of General Maxse's lecture, but for the information of those

who did not either attend that lecture or read it afterwards, he might say at once that General Campbell was a strong supporter of the eight company organization, especially for war, and that his opposition to the four company system was based on the very practical experience which he had in command of a battalion some 1,100 strong during the South African War.

General Campbell felt that by the adoption of the four company organization they would cramp the individuality of four out of the eight officers at present commanding companies, that an officer would, under such a system, obtain full responsibility too late in life, that is to say, only after some 15 or more years' service; and that a young captain, or an adjutant, placed under an unsympathetic major, who might be relatively not as efficient, would soon lose a great measure of his zeal and enthusiasm.

He considered also that eight companies were more elastic than four companies, that they were more easily controlled, especially on outpost duty and in wood fighting; and, last, but not least, that there was an immense amount of *company spirit* and healthy rivalry between their present companies which it would be a pity to destroy.

He had not yet had an opportunity of talking the matter over with General Campbell, but, from the notes which General Campbell had sent him, he thought that the above fairly represented some of the salient points, though by no means all of them, which he adduced in support of the eight company organization, and he might add that he had, he understood, never wavered from those views.

Speaking for himself, and without entering for the moment into the relative merits and demerits of the four and eight company organization, it seemed to him that the crux of the whole question was the removal of the specialists or permanently employed N.C.O.'s and men from the company establishment to the battalion headquarters establishment, so that a company commander might be able to train progressively and systematically, each in his own sphere, every individual placed under his charge, and at the same time, have sufficient numbers at his disposal to enable him to carry out the war training of his company effectively.

The difficulty in this respect applied equally to both systems, and any remedy on the above lines would no doubt mean money, but the gain in fighting efficiency that would accrue seemed to warrant the additional expenditure involved.

The Chairman: Before I proceed to discuss the subject of the excellent lecture we have heard, I should like to refer to some remarks made by Major Burrowes. He spoke as though he thought the authorities had decided on a change to the four company system, whereas, I believe I am right in saying that the matter has never been even discussed officially, and that, therefore, he has nothing to fear at present. That this problem of four or eight companies is by no means an easy one to solve is evident from the very decided and opposite opinions one has heard lately on the subject from senior officers of eminence and younger officers who have established a right to be considered as serious students of their profession. Personally, I take the view that the case for the momentous change to four companies is by no means proved yet, and that until it is beyond dispute we shall be most unwise to attempt the change. I was, unfortunately, in India when General Maxse delivered his forcible lecture, but I have read it, and whilst being much impressed by the ability with

which he brings out the shortcomings of our peace training, I am by no means convinced that he has made it clear that a change to four companies would necessarily remedy any of those shortcomings. I certainly do not agree that the change will furnish a solution of one of the greatest —if not the greatest—of our infantry training problems. I refer to the problem of controlling infantry when once extended and fairly launched in the fire fight, and in his counter-arguments on this head I entirely agree with the Lecturer. That the change would give us larger units in the *United Kingdom* for peace training is undoubted, but this is got over by working two companies together as a double company when the single company falls below a certain strength, which at Aldershot we fixed at 70. I regard this peace training in the United Kingdom as the origin of the idea that a change in organization is necessary. Certain people have become affected by what they see daily before their eyes, and forgetting all other sides of the question suggest a remedy which is no real remedy at all. I ask, has anyone ever seen a company 250 strong? It is a body almost as big as many of our peace battalions on parade, and the idea of one man controlling it when extended so as to get the highest standard of efficiency out of it is impossible to accept. The shortcomings are not due to the number of or size of the companies, but to the difficulties inherent in a voluntarily trained army, such as recruits joining at all periods throughout the year, annual depletions throughout the trooping season for foreign drafts, and also to the necessity for keeping our peace establishment low for financial reasons. But General Maxse undoubtedly hit the nail on the head when he emphasized the importance of being able to keep our half company and section commanders permanently with their units. With them highly trained, the instruction and control of the reservists flocking to our units on mobilization would be a comparatively simple matter. Think, gentlemen, what happens at present! Each battalion expecting to be plunged into battle within a fortnight, suddenly swamped with five to seven hundred reservists. Lucky will the company be that has two or even one highly trained section commander. Imagine the fire and manœuvre control of the sections! Does this strike you as a suitable machine for war? I quote an order published by General Oku, commanding the 2nd Japanese Army during the Russo-Japanese War.

> "The essence of strict discipline is only attained when relations of the most implicit confidence are established between officers and men."

To this I would add "and section commanders." Can we expect anything of the sort with our present weak peace establishment? I also think General Maxse's proposal for a headquarters section very important, and that this, if introduced, will help the reality of our company training. It is true that this, and the permanency of section commanders, "which means maintaining in peace the war establishment of officers and sergeants, and extra non-commissioned officers in addition for recruit training," will entail extra cost, but efficiency will be so enormously increased that I should regard it as a great day for the Army when the innovation was introduced. To get full effect from the modern rifle, very highly trained section commanders are essential, and I can think of no measure which would more surely improve the efficiency of our infantry than one which would ensure their permanent presence with their sections. If I could be convinced that the introduction of the four

company system alone could bring about such improved conditions I should be the first to advocate it, but with the knowledge I possess at present I should regard such a change as a grave gamble. First of all we are by no means sure that large companies are a thorough success in war; indeed, rumour has it that they caused considerable confusion in the 1870 war. But these huge conscript armies are driven to them as they find it impossible to furnish sufficient officers for small companies. Conscript armies, however, have two advantages over us, which to a certain extent minimize the evils of paucity of officers—the average intelligence of their men is higher, and the standard of training, owing to their recruits all joining together, is more uniform, advantages which admit of less personal supervision by officers and section commanders. Then, again, are we sure that these large Continental companies are trained to our high standard of individual training, and might not the adoption of the large companies by us result in a lower standard of individual training—which is what we pride ourselves on? Personally, I think it would. Individual training by the company commander is the essence of efficiency for modern fighting, and this is only possible when the company commander knows every man in his company. Can he possibly do this with 250 men? Have we not heard that foreign officers envy us our small companies and admit that they would prefer them themselves if they could find the officers?

Then I ask you: Are large companies more suitable for our Overseas Army? India, for instance, where their normal condition is strong companies of highly trained men, and where I am sure those who have seen them will admit that at training and manœuvres the captain has as large a body of men as he can efficiently command. For outpost and detached duties the company of 100 men is a most convenient unit, and most important of all for night duties. This point Colonel Whigham has very clearly brought out. Now, I am sure that you will all agree with me that night movements and night fighting have become of the very utmost importance, and it stands to reason that, if men are to be properly controlled under such conditions, they must be in small units and easily commanded. One point urged by the advocates of the four company system is that it would give us more mounted officers with a battalion. It is true that for duties outside the aim of the enemy's weapons more horses would add very much to the efficiency of the infantry battalion, but these are already provided by our latest war establishments, and, therefore, further legislation on this subject is unnecessary. But horses are of no avail for the control of the men when extended in attack, which is the time General Maxse urges that the four company system is going to prove its effectiveness. Nor can I follow his argument that the large company is to give greater responsibility to the subaltern, for I cannot myself appreciate the difference of commanding 50 men in a company of 200 and calling it a section, and 50 men in a company of 100 and calling it a half company. To my mind, until we have a measure introduced which will ensure officers being permanently with their companies, the subaltern will have no more fixed responsibility in the large company than he does in the small. In fact, I cannot agree that the shortcomings spoken of by General Maxse will be remedied by the change to the four companies. There probably are administrative advantages in the large companies, but the long period during which the captain will act as second in command, carrying out the administration alone, is hardly likely to add to his improvement as a commander in the field and surely field efficiency should rank before administrative convenience.

Were I to go through all the various pros and cons I should be at this desk, though probably with an empty house, for an indefinite period. I therefore conclude with an emphatic hope that those most concerned be consulted before any change is made. I refer to the regimental officers. They are, I believe, the most earnest and honest body of men in the Empire, and this will, I am sure, be borne out by every General who has watched them at training for the last few years. They study their profession, and know where the shoe pinches. If they say that having to wait 15 to 20 years for the independent command which they now get in 8 to 12 years is going to damp their ardour, as I feel sure it must do, I must ask you to accept that as the most telling argument against the change. Zealous officers, accustomed to think and act for themselves, are, to my mind, the most valuable asset an Army can have. If you study the Army List you will find that as a rule our most successful officers are those who were fortunate enough to gain experience and independence of action early in life, and I should be sorry to see appointments which train them in these respects curtailed by almost one half. Finally, it must not be forgotten that the reduction in the number of companies opens up a possibility of reducing the establishment of these invaluable company officers I have been referring to, and that this might prove an irresistible temptation to some War Minister of the future who reversed the present order of things by placing "economy" before "efficiency." Our eight company system has stood the test of war, it is suited to our Overseas Army, it is suited to our Territorial Army; therefore my advice is to let it stand until its advantages are proved to outweigh the disadvantages far more than is apparent at present. In conclusion, I ask you to join with me in offering our warmest thanks to the Lecturer, and the many gentlemen who joined in the discussion, for the very interesting and useful afternoon we have had.

APPENDIX I.

Colonel T. E. Gough, V.C., C.M.G., A.D.C., has forwarded the following remarks which he had intended to offer at the Discussion had he been able to attend Captain Kentish's Lecture.

The subject of the lecture is most important, and has been attracting considerable attention lately. If I had been able to attend I would have liked to have said a few words in favour of our present small company organization.

A good many officers have been advocating a change to double companies, and there is, perhaps, a danger of it being thought that the majority of our officers are in favour of a change—I do not think this is really the case.

Briefly, I prefer our present organization for the following reasons:—

1. *It stood the trial of the South African War.* As far as I know, no one during the war thought the small companies were unsuitable for war, or that as good or better results could have been obtained by a double company organization. Also it is worth noticing that our extensions were greater in South Africa than would be the case in a European war, and in spite of this our company commanders were well able to control their companies. Could we do this with double companies? I doubt it.

2. The small companies would be much more easily handled and controlled in night fighting than double companies. This seems to me to stand to reason.

3. Our present organization gives an officer command of a company after about nine years' service. With double companies officers would not get command until they had between 17—18 years' service.

I attach great importance to this. We cannot give officers responsibility too young. The argument that officers exist for their battalions and not the battalions for the officers does not appear to me to apply to the subject. Everyone knows the saying, " Bad officer, bad company"—" Good officer, good company."

Far and away the best way to learn any trade is to be placed in charge and given responsibility young. Mistakes undoubtedly will be made, it is only natural. But we learn by our mistakes, and it is far better that we should make mistakes and learn by them while we are young and during our peace training, than that we should not be given a chance of making mistakes until we have arrived at the age of 37 or so (two years older than Napoleon at Austerlitz).

4. We do not find officers abroad, where companies approximate to war strength, advocating a double company system. The desire for double companies is practically limited to officers serving at home.

This seems to me to show that the real cause is not that our present system is unsuitable for war, but that battalions serving at home have considerable difficulty in carrying out their peace training, this difficulty being, of course, attributable to a small peace establishment, and the system we have to adopt for training recruits and sending drafts to foreign battalions. These difficulties would have to be faced just as much with a double company organization as at present.

5. On service, and, in fact, at all times, a company commander should know all his men, their virtues and failings. With a small company this can be done, but not with a double company.

6. I am in thorough agreement with the officer who wrote the article " Battalion Organization " in the April number of the " Army Review."

APPENDIX II.

Note by the Lecturer on points raised by speakers during the discussion.[1]

If time had permitted me to do so I should have replied to those speakers who in the discussion which followed criticized my contentions. Colonel Lord Raglan stated that it was just as simple for a Commanding Officer to give his orders for the attack to four Majors as it is to eight Captains. I quite agree, but I think that Lord Raglan has overlooked a very important point in the argument, and that is that one Captain, in the present system, misunderstanding his orders only misleads 100 men, whereas in the four-company organization one Major would mislead 250.

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[1] Owing to the lateness of the hour the Lecturer did not reply at the close of the discussion.

Lord Raglan stated that he handed over his battalion of Monmouthshire Engineers as a four-company organization, which worked perfectly in peace time. Here we have an officer advocating the abolition of an organization that has admittedly successfully *stood the test of war, in favour of an organization, which, to say the best for it, has only worked well in peace*, and only then in a Militia battalion of Royal Engineers. What we want is war experience of our organization, and we have only to turn to the histories of our campaigns during the last 100 years and we find ample record of our battles being won by our infantry formed not in four big companies but in six, eight or ten smaller ones; and if this is so, and no one has yet apparently been able to deny the accuracy of the statement, why make this alteration?

General de Lisle stated that he was bound to say that he liked the system that obtained both in the cavalry and the artillery, because it provided a definite command for the subaltern officer, who in the one case had his troop to command, and in the other his section. This may be all very well, but General de Lisle made no mention of the very unfortunate position of the captain in both these arms. My conversation with both cavalry and artillery officers concerning this officer's position has brought me strong proof of the contention I hold, and that is that their position is no position, that they have no definite status in a squadron or a battery in peace. And I say again, that if you introduce this unsatisfactory system of dual control into the infantry, the Second Captain will be in an even more unsatisfactory position than are our cavalry and artillery captains to-day, for he will have even less to do.

In conclusion, I desire to state that it is a matter of regret that many staff and regimental officers who were present and ready to speak in favour of the retention of our eight companies were owing to want of time unable to do so. But it may be of interest to those who read this paper and the discussion which followed, to know that a very great number of serving officers of all ranks, both staff and regimental, have in letters to me expressed their views in favour of the eight company organization in no uncertain manner, and that one and all base their contentions from a knowledge gained on active service.

THE NAVAL PROBLEM.

Paper read at the "Institut Maritime," on the 13th January, 1912,

by Rear-Admiral DARRIEUS.

(Translated from Supplement to the *Ligue Maritime*, Feb. 7th, 1912, and published by permission).

IN choosing the subject of this paper I do not blind myself to any of the difficulties of my task. I have, in fact, to deal with a problem of the greatest possible complexity—the problem of naval organization—before an audience which is in the habit of coming to this hall for intellectual refreshment or literary relaxation. My excuse for not having been deterred by the difficulties of the undertaking lies in the belief that I am influenced by the very spirit in which the "Institut Maritime" was founded, in thus addressing you to-day on one of the most important of all questions—a question that has now for several years engaged the earnest attention of the French nation.

Questioned as to its very right to exist, attacked by innumerable hostile criticisms, and enfeebled by positive defects, our Navy has witnessed the gradual disappearance of that fine confidence reposed in it by the nation in days gone by. The crisis, during which it has lost the proud position that it once occupied as first among the navies of the world after England —a position which no rival would have dreamed of disputing a short time ago—has produced a most regrettable result, in that it has inoculated public opinion with the germs of a false and disquieting pessimism. Very fortunately there are few indeed who contest the utility or even the necessity, of a powerful Navy for France. No doubt, in spite of all the evidence, there are still to be found sophists, who prefer some vague and fantastic theory to the teachings of history, forgetting that experience—the only guide in such a matter—has long since pronounced its verdict. But they are the exceptions, and it would be useless to attempt to convince them. For the great general public, which asks for facts, it was demonstrated in this very place, a little more than two years ago, that our beloved country has never, at any period of her history, been so greatly in need of a strong navy—a very strong navy—as she is to-day; her very safety is at stake.

The great debate on the same subject instituted last year by the *Ligue Maritime* has furnished, moreover, an abundance of irresistible arguments, and it would be idle to attempt to lay further stress upon them. The continual growth of our League will promote an indispensable diffusion throughout the country of this fundamental notion, and, therefore, I will not further dwell upon it here.

But, If I have no fear as to whether France will realize ultimately her naval vocation, I confess that I am a little less assured as to whether she will have the strength of will to respond to it. The excuse for this timidity is not to be sought only in the almost universal ignorance of public opinion in regard to naval affairs, but also in the profound confusion into which it has been thrown by its consciousness of the anæmia from which our naval institutions have suffered for a long time past, and of the somewhat mysterious nature of this languishing disease. The necessity for adopting energetic remedies is understood; but what are the proper remedies, and by whom are they to be initiated? Truly there is no lack of physicians—of those at least who give free advice; I will even go so far as to say that there are too many of them, and the extreme diversity of their prescriptions—most often contradictory, and invariably based upon faulty diagnoses—deprives their advice of all practical value.

Again, the attempt to fix responsibilities, to which another class of specialists is devoted, appears equally vain. One does not hunt for the incendiary when the house is on fire; it is first of all important to extinguish the fire—the necessary punishments will come afterwards.

Now, the causes of contemporary naval decadence are manifold; some—and these are the most grave and the most numerous—are within, others are without, the Navy. Their history will one day make curious and interesting reading; it will open the eyes of all those (and they constitute the majority) who judge things superficially, or refuse to be guided by the evidence of facts.

In reality, it must be due to constant forgetfulness of its *raison d'être,* during the last half century, that the French Navy of to-day has allowed itself to be dispossessed of its former uncontested power.

A national Navy is a military organization created solely for the supreme end of warfare, and all its calculations should converge towards preparation for battle. It must then necessarily obey all the rules of the art of war, and, *ipso facto,* must prepare all its effective forces for concentration for battle "at the decisive spot, and at the decisive moment."

This brief formula reveals the magnitude of the task, but it also shows the imperative necessity for a far-seeing method, leaving nothing to chance or improvization.

In this terrible game of naval warfare, where the destinies of the nation constitute the stakes, the "pieces" are represented by the various elements of naval force; these must be disposed judiciously and used to the greatest possible advantage with reference to those of the probable enemy.

There is no military institution which is in more urgent need of foresight than the Navy, for the difficulties in connection with the personnel, which it shares in common with the Army, are coupled in its case with those resulting from the importance of the matériel.

The faultless naval strategy of Napoleon ended in the lamentable check which is known to all of us because the vessels of Villeneuve were lacking in necessaries; we are familiar with the lamentations of the unfortunate Admiral Cervera on sailing for the Antilles without ammunition and practically without guns; whilst the events of the Russo-Japanese War are of too recent occurrence to allow us to forget the destruction of the Russian fleet.

In this connection it may not be entirely devoid of interest to recall the fact that prior to 1904 the doctrine was preached among our allies, as it is still affirmed at the present time by some amongst ourselves, that the funds allotted to the fleet should be parsimoniously limited for the profit of the Army. Now these economies became transformed, during an unfortunate war, into an expenditure six times as great, which might have been avoided if the Muscovite stategy had been methodically prepared, and its action calculated with a view to sustaining a sufficient effort.

It cannot be repeated too often that fleets do not rise up all ready out of the sea at the summons of a magic wand. If they do not exist when hostilities commence it is too late to create them. A navy is essentially an institution of forethought, more so than ever to-day, when the complexity of our fighting units and matériel demands the work of time. A good working method is therefore indispensable, whether it be in the maintenance of prosperous naval institutions, or in the proposed creation of new ones, or in the revivifying of existing ones.

To define the principal rules which should be followed in creating, reviving, or simply preserving a strong and vigorous naval organism—such is, briefly, the problem to which I propose to-day to offer a solution.

The instrument of naval warfare being represented by fleets, the creation of these fleets becomes the primary object, from the very outset, in building up a naval organization.

THE FLEET OF OUR POLICY.

According to a popular *dictum*, a country ought to have the fleet of its policy. The formula, so correct in itself, but so

often abused in France in its application, means that the determination of the naval forces necessary to a nation, the principal characteristics of the units composing these forces, and the actual bases of operations from which their action is to be supported, requires previous knowledge, as complete as possible, of what may be termed the "constants" of the international situation.

In military art there are only concrete cases; there is no particular abstract solution of the naval problem applicable to every imaginable case of conflict. In fact it goes without saying, to give a definite example, that the same fleet which possesses a surplus of strength against little Portugal might be almost negligible when opposed to Great Britain.

Accurate knowledge as to the possible enemy or enemies, and the probable alliances or *ententes*, is therefore indispensable at the moment when the creation of a fleet is commenced. In a word, there must be a close relation between what is commonly called the naval programme and the foreign policy of the country. We can see at once the advantages, from this special point of view, to be derived from a fixed foreign policy and a continuity of outlook on the part of the men who are entrusted with its administration.

Briefly put, it is essential, in order to arrive at a sound solution of the naval problem, that this solution shall be the direct consequence of a national policy, constantly inspired by the traditions and interests of the country, and no longer fluctuating with the contradictory whims of short-lived governments. The unique and admirable example of England in following her splendid destiny for centuries almost unchecked, no matter who have been her leaders, and in spite of her internal crises, shows us the marvellous results that are achieved by the policy of a people, when that policy is raised to the level of a doctrine.

The constant experience of history having proved to all Englishmen that the maintenance of the command of the sea was the safeguard of their supremacy, naval power has always been for them the supreme object of their policy; but they have succeeded, with remarkable facility, in adapting this instrument to the needs of the moment, in increasing or reducing its strength according to the gravity of the danger, or the threatened attack of coalitions. They have contrived, moreover, to vary the direction of their energies so as to suit the prevailing circumstances, to act in the Mediterranean or in the Atlantic, to break down successively the opposition of Spain, of the Netherlands, and of France, in short to have always, with an incomparable continuity of success, the "fleet of their policy." Let us also, then, have the fleet of our policy; and if this policy is developed on sound and consistent principles the concrete solution of the naval problem will follow automatically.

I need hardly state that I am not in possession of any of the secrets of present French policy, and this puts me infinitely more at ease than I should otherwise be, in developing my arguments

here. Again, I shall have to restrict myself to the formulation of simple hypotheses, and this will hardly be a disadvantage, for what I have to do is simply to give the outline of a working method; this alone interests us here.

Certain incidents which have occurred too recently to have been forgotten by any of us will furnish me with just such an hypothesis as may be adopted without too great a semblance of unreality. In considering the German Empire as a possible enemy, perhaps even the most likely one, it seems to me that we shall not be going far outside the range of possible eventualities. The Maroccan difficulties, moreover, provided only one among numerous manifestations of that constant and quarrelsome antagonism, the indestructible seeds of which were sown forty years ago, in the relations of France and Germany, by a grave error of German military strategy.

The brutal amputation that followed upon the defeat of France was more than anything else a military error. The attempt to qualify it as a restitution of territory to the German Fatherland might be answered by an appeal to history—it was a geographical and political heresy, inasmuch as it deprived our country of her natural frontiers.

The object of the great German General Staff in demanding the cession of our two provinces was to drive a solid wedge of territory into the flank of the vanquished nation, so as always to have the latter at their mercy; but in thus creating a permanent source of conflict, they forgot the teachings of history. The greatest soldiers of the past have met with great reverses following upon success; but these reverses have been attributable not to their victories, but to their conquests.

It was the insatiable appetite of Louis XIV. in Flanders and Spain that aroused England against him and led to the Treaty of Utrecht. Austerlitz, Iéna, Friedland, and numerous other successes, would have been forgiven to Napoleon, if his designs upon Egypt, Spain and many other countries had not caused Europe in coalition to fear projects of universal domination, and this by the process of a fatal reaction, inevitably led to the Holy Alliance.

It is the conquests alone, I repeat, that have always brought about the downfall of the conquerors. The most peaceful man will not for ever be ground down beneath the heel of a tyrant. However grand may have been the realization of the dream of little Brandenburg, grown into the German Empire, the latter still cannot pretend to the glory of the kingdom of Charlemagne or of the Empire of Napoleon. History repeats itself; the same causes produce the same effects, and that is why a fresh Franco-German conflict seems inevitable in the future.

What fleet then should be prepared in view of a war with Germany? That is the concrete problem clearly stated. But the enunciation is not yet complete.

In the event of a conflict with Germany, would it be confined to the two nations? Briefly, should we be alone against her, or could we count on the assistance of allies, and, if so, what allies? Would she herself be isolated or supported by other Powers? This simple *résumé* brings out once again the very complex nature of the political problem with which the naval problem is closely bound up; it throws into prominent relief the cardinal importance of tradition and foresight in the government of a great nation. It is obvious, in fact, that if we are to fight even a single enemy with any chance of success, we cannot afford to be indifferent as to whether we shall stand alone or shall be able to count upon allies. In any case there can be no satisfactory solution to the naval problem if the hand of the barometer of national policy is subject to erratic oscillations. The urgent need of strategy is for concrete realities, and it remains powerless before the sudden and disconcerting shifts of the wind which have too often characterized the "foreign affairs" of our country. Here, again, the genius of England has always been able to find the happy solution in good time, the best alliance against the adversary of the moment, even though the ally of to-day may have been the enemy of yesterday.

Judging by appearances, the *Entente Cordiale* seems to afford us a guarantee at present that we should be supported by England in the event of war in the near future; moreover, the recent debates in the House of Commons and the Reichstag, and the comments in the world's press, to which certain notorious speeches of English statesmen have given rise, would lead us to believe that we can count upon the active co-operation of the British forces in the event of a contest with Germany. Nay, better still, the community of interests, which is stronger than any treaty, would prevent our neighbours across the Channel remaining merely passive spectators of a new duel from which the German hegemony might emerge this time all powerful.

But, sentimental people that we are, whom no chastisement corrects, we at once believe in the eternity of bonds that have been forged by interest. "Where is the need for France to attempt to regain the naval rank which she has lost, since she can command the assistance of the strongest navy in the world, that of her ally, England? Let us therefore economize on the Navy and concentrate all our efforts upon the Army." This foolish reasoning in the first place ignores the fact that in placing ourselves under the protection of our neighbour, however friendly he be, we subscribe to a humiliation that is worse than defeat, and in any case unworthy of a great nation like France, and insulting to a Navy upon which an insignificant rôle is thus imposed in advance, in spite of the many glorious pages of her history—pages signed by Duquesne, Tourville, Suffren, Courbet, and many others. But, what is of still greater consequence, it neglects the constant teaching of history to

the effect that alliances dissolve with the interests which have brought them about.

"England," wrote Talleyrand, "is guided solely by her interests." Metternich said also on one occasion, that "every Power was guided by selfish considerations and pursued its own particular ends."

The work of Richelieu and Mazarin was pre-eminent because it inaugurated in France a policy based solely upon the true interests of the country.

Coming to more recent times, when Lord Charles Beresford was discussing this very *Entente Cordiale* and the polemics of the Press with regard to supposed agreements, in virtue of which the English Admiralty would be able to abandon the Mediterranean, leaving it to be guarded henceforth by the French squadrons, he reminded his hearers with just reason and in the language of a true fighter, that, in the matter of military preparation, a great nation ought to rely solely on herself.

Interests, like friendships, are varying quantities, strength alone is a constant factor. Properly understood, the regard for our own safety should induce us also to look to our own resources for the solution of the naval problem. The stronger we become, the greater will be the desire to cultivate our friendship, and the less we depend upon the help of our eventual allies the more surely shall we be able to count upon their readiness and loyalty.

It may be accepted then that the possibility of a single handed struggle with Germany should serve as a basis for the study of the naval problem. It is all the more legitimate to accept these premises when it is remembered that every coalition is answered by a hostile one which seeks naturally to restore the balance of power: to the Triple Alliance is opposed the Triple Entente, and *vice versa;* these combinations are translated into associations of naval forces, and in order that there may be a final equivalence, it is essential that each element of the group shall possess the greatest possible value individually.

From whatever point of view we look at the question, the fleet of French policy is, then, the fleet which will enable that policy to fight the German Navy on equal terms. Such a fleet alone will be able to contest command of the sea with its adversary, and, by securing it, to guarantee to the French Armies full liberty of action in the Vosges.

We are now in a position to estimate at its true value the sophistry which would sterilize the new-born effort of the French towards the resuscitation of their Navy by submitting it to the rules of a singularly arbitrary process of reasoning.

France, it is said, devotes 1,500 million francs per annum (£60,000,000) to national defence; of this, the Army absorbs 1,000 millions (£40,000,000); the Navy must therefore be content with the remainder. In order to show the grave error

contained by a mode of discussion that is foreign to the art of war, I will merely remind you once again (for it always comes to the same thing), that it was also the fashion in Russia ten years ago to higgle over every expense in connection with the Navy. The thesis that the latter was of no use whatever had numerous adherents. Now, the presence in Far Eastern waters, in the early part of 1904, of a Russian fleet of superior strength to that of Japan would have rendered all idea of war impossible, and it is not without interest to notice that such a fleet would have cost barely 1,000 millions (£40,000,000) whilst it is calculated that the defeat of the Russians involved an expenditure six or seven times as great. Nothing is more costly than an unsuccessful war, and it cannot be too often repeated that efficient and prudent preparation for war is economical in the long run; it represents the best form of insurance against the risks of international conflicts.

THE NAVAL PROGRAMME.

The rapid rise of the German Navy, to which every naval man owes a just tribute of admiration, if he regards it from the professional point of view, dates from hardly a dozen years back; the law which first gave it an impetus was actually dated 14th June, 1900. There does not appear to have been any uneasiness in France about this unexpected rival, who, however, already announced very clearly her pretentions to naval domination; it appears rather that we were lulled into a sense of false security by our then unchallenged position as second naval Power of the world.

The rapidity with which the relative order of these Powers has been completely upset proves once again, and in striking fashion, the supreme importance of method and foresight in the preparation of the naval forces for war.

Prior to the law of 1900, the respective positions of Germany and France, from the naval point of view, assured us an indisputable margin of superiority. The constitution of the German Navy, before the law of expansion, was known as that of the Sexennat, the comparatively modest provisions of which fixed the composition of the fleet at 19 battleships, 12 armoured cruisers, and eight armoured coast-defence vessels, *i.e.*, a total of 39 ships of the line.

Now, at the same time the laws providing for the French Navy fixed the necessary naval forces at 28 battleships and 24 amoured cruisers, *i.e.*, 52 ships of the line.

The difference between the two figures was more than sufficient to guarantee the preservation of her naval supremacy to France.

The Imperial Law dated 14th June, 1900, suddenly augmented the naval programme, increasing the numbers of effective vessels of the German Navy to 38 battleships and 14

armoured cruisers. Merely considering the aggregate of 52 ships (the same as ours) it might be imagined that the balance of power was still preserved. In reality, an examination of the quality of the units provided on the one side and the other would show that it had been altered in our rival's favour. In providing 38 battleships for the main battle fleet against the 28 only of France, they already gave evidence of their intentions, since too well realized, of dislodging us from our naval rank.

It may be affirmed, then, that the year 1900 was the critical period of our contemporary history as far as French naval policy is concerned. It was at that moment indeed that wise provision should have been made for the future.

Our own naval programme, dated 10th December, 1900, and consequently later than that of the Germans, did not include any modification of preceding provisions. Yet it would have been only logical to follow with an attentive eye the early stages in the evolution of a hostile Power which threatened to become formidable, and to watch closely the trend of its policy, with the object of putting forth a corresponding effort, at any price, to provide the necessary counterpoise.

Naval strategy, which is only a particular case of the art of war, deals, I repeat, with concrete realities. It brings into play certain forces opposed to certain other forces. Hence it would be impossible to understand how our country could have permitted a formidable naval Power to grow up beside her until she had allowed herself to be supplanted, and that without any feelings of uneasiness, if we did not know that in reality she has adopted the well-known tactics of the ostrich, hiding her head among the stones so that she shall not be able to see. This is so true that, far from adjusting its naval efforts, however timidly, to the constantly increasing ones of its ever probable enemy, and thus showing that it understood the working of the variable function which governs two opposing forces in war, the French naval administration actually curtailed its ambitions.

While the German fleet, for which provision had been made in 1900, was further augmented in 1906 and 1908 by the addition of six units, so that its fighting ships were now increased to 58 in number, the new French naval programme, drawn up in 1909, and at the present moment still unratified by Parliament, accepted the principle of a fleet of only 28 battleships. That a sacrifice of 24 units (in comparison with every previous decision of successive *conseils supérieurs*) has given rise throughout the Navy to an immense amount of feeling will be easily understood; it explains why this project was at once dubbed in naval circles the programme of "resignation." What remains inexplicable is the principle upon which it is based.

The creation of a fleet, one must never be tired of reiterating, should always be based upon a concrete hypothesis. It

would, therefore, be interesting to know what was the hypothesis which gave birth to the idea of 28 battleships; it is not easily guessed.

It certainly cannot be one in which the eventual enemy is assumed to be the German Navy. The inferiority in numbers, increased to a remarkable extent owing to the division of our forces rendered necessary by our geographical situation with two distinct seaboards, is far too great to leave much room for doubt as to the issue of such a conflict.

Can the hypothesis be one in which our naval rôle, in a struggle of complex coalitions, would be to contain the two united fleets of Italy and Austria-Hungary? Apart from the fact that such a conception contravenes the principle of "*Fara da se*" already enunciated (and, remember, indispensable, if it be desired to avoid all disappointments) the programme would still be insufficient for the purpose.

In obedience to a kind of universal summons which has sounded the naval reveillé for all the nations, Austria-Hungary and Italy are giving evidence of something more than a mere inclination for naval activity.

The Austrian naval programme, it is true, does not contemplate a complete scheme for the constitution of a fleet in imitation of the German and French programmes; it simply provides for the construction of four "Dreadnoughts" of 22,000 tons; but its very indefiniteness indicates that the Austro-Hungarian Empire, evidently counselled by its powerful ally, does not intend to place a limit in advance upon its naval effort. And in any case the addition of these four up-to-date units will considerably strengthen the two existing divisions, one of which consists of three 14,500-ton battleships, equal in every way to our "Patrie" class, and the other of three 10,600 -ton battleships, less powerful, it is true, but under eight years old, well armed, and not to be left out of account.

To sum up, if the Austro-Hungarian Navy cannot by itself be regarded as a dangerous force, it would certainly form an appreciable addition of strength in a possible coalition against us; henceforth, and without prejudging a future which may contain still further anxieties, the forces of the Austrian Navy must form the object of our closest surveillance.

As regards the Italian Navy, the forces at present ready, or on the point of being so, taking into account only warships which have had less than ten years' service, reckon up to six battleships of 12,600 to 13,400 tons' displacement, four battleships of 20,000 tons, under construction, and two others, of 24,000 tons, projected.

Hence, in order to retain the command of the Mediterranean, which is indispensable to us, we shall require at the expiration of a period of about three years, to be able to oppose a superior force to that of a possible coalition which will be in a position to place in line of battle 12 still very powerful

second-line battleships supporting a first-line group consisting of ten "Dreadnoughts."

Now, according to our present plans, and within the same period of time, we should be able to devote to the execution of our scheme of naval operations in the Mediterranean six battleships of the "Danton" type, five "Patries," four "Jean Barts" ("Dreadnoughts"), and (in order that we may not be accused of harping on a pessimistic note) the seven 12,500-14,000-ton armoured cruisers of the "Waldeck-Rousseau" class, etc., notwithstanding all the justifiable reservations that a naval man is entitled to make in view of the reduced offensive power of this class of ship, especially when opposed to battleships.

The forces mustering in the "French lake" would be actually ten "Dreadnoughts" and 12 second-line battleships on the side of the Austro-Italian coalition, and four "Dreadnoughts," 11 second-line ships, and seven armoured cruisers for France. Perhaps the classification which I have just made will be challenged, and it will be claimed that the "Dantons" should be included in what is commonly called the "Dreadnought" class. The real value of the offensive power, which depends upon the gun-armament, being the sole criterion of the class to which a ship belongs, this contention might be repudiated; but let us give good measure and make the necessary concession in order to avoid any useless discussion.

Let us concede then that the French Navy will have at its disposal, in three years' time, ten "Dreadnoughts" and a second-line group of 12 ships.

Our calculations thus lead us to assume numerically equal forces on either side, the second-line division being certainly inferior in quality on our side. We cannot, therefore, be absolutely certain of being masters of the Mediterranean, since, in order to obtain this result, it would be necessary to destroy by battle the initial equality of the opposing forces. Moreover, the task would be complicated for the French squadrons by reason of our Mediterranean policy. Whilst our opponents would be able to act entirely on the offensive, our fleet would be compelled to adopt a defensive rôle (fraught with all kinds of difficulties and dangers) owing to the immediate obligation, periodically laid upon us by public opinion, of bringing back to France the 19th Corps, unless we succeeded in obtaining the definite abandonment of this deplorable conception.

As far back as 1899 the Minister of Marine pointed out to his colleague the Minister of War the very grave strategical error involved in such an operation, and disavowed in the most emphatic terms the responsibility of his department for carrying it out. It is more than ever imperative to renew that protest. The transport of a convoy of troops across a sea which is not free at the outset is possible in two cases only, and two cases which really constitute but one. Either the destruction in battle of the enemy's fleet is an accomplished

fact; or else, by means of overwhelmingly superior force, such as could leave no doubt about the result of an encounter, the enemy has been compelled to shut himself up in a port, where he is rendered powerless. But apart from these clearly defined conditions, the whole course of history has shown, with a singularly disquieting persistency, that the worst disasters are invited by hazarding convoys, even when protected by squadrons, upon seas patrolled by the enemy's fleets "in being."

From whatever side the problem is regarded the insufficiency of our naval effort is obvious. We cannot fulfil our naval obligations in this sea with squadrons whose strength is calculated too finely in comparison with that of the Mediterranean naval Powers. We must make firm resolutions, and undertake much more energetic naval action. The latest terms of our naval programme do not give us, from any point of view, "the fleet of our policy;" such is the conclusion to which we are forced by any examination based purely upon strategic considerations.

These strategic considerations coincide with the general interests of the country; and, indeed, there is no cause for surprise in this. If I have succeeded in demonstrating the close relationship which exists between the foreign policy of a great country and the fleet in which that policy should be faithfully reflected, it will be at once understood why every naval programme is, or should be, the concrete solution of a clearly defined problem. Its explanatory statement is nothing more or less than an official résumé of foreign policy, revealing, with the greatest possible clearness, the motives that have dictated the choice of the object or objects aimed at, and at the same time affording an exposition of the international situation. The task of professional men, set to find a definite solution to the naval problem, would be greatly facilitated if the latter were stated in similar terms. Now, this has not been the case in France for 40 years; and one would imagine, from a perusal of the numerous propositions formulated during this period on the subject of naval construction, or from the reports of parliamentary debates to which they have given rise, that the choice of a fleet, and of the number and quality of the vessels of which it is to be composed, is decided solely by sentiment and according to the too-frequently changing ideas of the moment. No idea has ever been more disastrous to the French Navy. On the other hand, in taking as our ultimate aim the creation of a counterpoise to the most important force that could be opposed to us, viz., the German Navy, we return to a true conception of naval policy. This counterpoise, in the case of naval forces, is not to be measured solely by the exact number of ships of the line to be opposed to those of the enemy; other and no less important factors enter into the case, *e.g.*, the concentration of forces, the degree of material and moral preparation, the offensive power of the units, the strategic positions occupied, etc. In short, a naval programme should

have for its point of departure not an arbitrary number of ships, which is necessarily subject to constant revision—as is indeed once again the case with us—but the number of squadrons corresponding to a plan of armament which is itself the natural consequence of the country's foreign policy.

Examining things from this point of view, we shall understand the necessity, so often proclaimed, for homogeneous squadrons, and we shall find in the *present* naval forces of France the necessary elements of six groups, or six squadrons, each composed of ships of the same type, *viz.*: One squadron of "Dantons," a second of "Patries," a third of the old battleships of the "Saint Louis" type, a fourth containing the large armoured cruisers of the "Léon Gambetta" type, a fifth composed of the armoured cruisers of the "Condé" type, and lastly, a sixth comprising the old cruisers of the "Pothuau" class. The limitation to four squadrons only, as sanctioned by the naval programme, is thus a retrograde step when compared with our present situation.

Some may be inclined to object that, in including mere cruisers in the list of battleships, I am stretching a point in favour of my own views. It will be sufficient for me to remind you that the old and entirely mistaken idea which placed the armoured cruisers in a class by themselves is happily abandoned everywhere to-day. The most precious advantage reaped from the beneficent study, in the Navy, of the laws of warfare has been the realization of the fact that the real value of the warship is primarily to be measured by its offensive power and depends only secondarily upon its other characteristics—speed, radius of action, protection, etc. "The best protection," said Farragut, "is that of the fire of one's own guns."

What else are the "Lion" of England, the "Moltke" of Germany, and the "Kurama" of Japan, armed as they are with 12-inch guns, if they are not ships of the line having less protection and more speed than the "Dreadnoughts," the "Saint Vincents," or the "Oldenburgs"? They are "Dreadnoughts" themselves. The idea is no new one. What were the ships that composed the cruiser squadrons of the old sailing fleets except vessels selected from the swiftest sailers? Once again the meaning of the general principles that govern naval strategy is brought home to us. Nor can we forget that the Japanese at Tsushima placed their armoured cruisers in the fighting line, and here we have the verdict of the supreme authority—experience.

Hence, if it is legitimate (as it is) to reckon these vessels as ships of the line, are we not equally right in demanding that our present method of grouping them shall be preserved and simply brought up-to-date?

If the principle of having six squadrons as at present is maintained, the real naval programme then assumes the form of a periodical replacement of each of these homogeneous naval

forces, beginning of course with the most antiquated—first the "Pothuaus," then the "Saint Louis," thirdly the "Condés," etc.

Adopting a maximum age of 20 years for the units, it will be seen that by 1920 three of these divisions should have disappeared, to make room for others composed of modern ships; this effort means the construction of 27 battleships, or, deducting the "Jean Bart," "Courbet," "France," and "Paris," which are already launched or laid down, 23 ships only. Reckoning three years for construction and completion (and it only needs a little determination in order to do this) a programme of this nature would require the laying-down regularly of three battleships a year. Is such an effort really beyond the resources of France? In order to answer this question, it is only necessary to have studied the marvellous vitality of this country throughout her history, and more especially to have felt its pulsations in times of difficulty.

The accession of strength furnished from year to year by the entry into service of these powerful modern ships would speedily enable France to regain a very honourable position among the Naval Powers and to satisfy all the demands of her policy. By concentrating four of the new squadrons in the Mediterranean she would obtain an absolute guarantee of remaining mistress of that sea. If it seems that the necessary expenditure is too heavy, let me remind you once again how the merchants of Amsterdam in the 17th century were roughly dispossessed by England of the Empire of the seas because they would not pay the insurance premium against war risks, which then, as now, was represented by a powerful fleet.

You will no doubt be surprised that I have reckoned upon squadrons composed of nine ships, whilst our naval programme allows for only six. This is, indeed, a very important point, and I think I had better explain it.

Alone among the Naval Powers France has been satisfied up to the present time with squadrons reduced to six units, whereas the similar divisions of the great rival navies, the English, American, German, etc. (both as planned by shipbuilding programmes, and as adopted for exercises, manœuvres, or evolutions in peace time) comprise eight or nine ships.

Is there any sufficiently convincing reason to justify this derogation on our part from what is virtually a general rule hallowed, as it were, by long experience? I know of no other reason except that furnished by a custom which ought to be given up at the earliest possible moment.

On the other hand, I do perceive the disadvantages, nay, the dangers, of this exception. As the squadron is really the unit of naval force, it is obvious that it must reach the same standard of strength as those of the probable enemy.

The sad catastrophe of the "Liberté" also shows the dangers of a custom which, I repeat, is followed only by ourselves.

The Second Squadron, reduced to five ships, is, in fact, positively impotent, and without going so far as to predict further disasters similar to that which has just plunged the country into mourning, it is always to be anticipated that accidents, repairs, etc., will never allow squadrons of only six vessels to be maintained at full strength.

As a matter of fact, numerous tactical exercises and manœuvres of all kinds have shown that the ideal composition for a modern squadron is that which comprises eight battleships, formed into two divisions of four ships each. And if (as is highly desirable) we determine to count upon a squadron always at full strength, a ninth vessel must be provided as relief ship.

This method of determining the value of the fleet as a whole by the number of its squadrons, pre-supposes of course that it is composed of units equal at all points to those of the rival navies. Without this condition it is perfectly obvious that they cannot realize the conception of "naval forces" endowed with the function of upholding the policy of the country. It follows at once, *ipso facto,* that the design of the "ship of the line" ("*bâtiment de combat*") does not admit of any arbitrary ideas, but conforms of necessity to certain rules which cannot be transgressed with impunity. In a word, the determination of the principal characteristics—offensive power, speed, radius of action, protection, etc.—must proceed upon strictly methodical lines, and in accordance with the principles that govern the art of war.

Battle being always the first and last purpose of warfare, the choice of the principal weapon (the gun in this case), the calibre, the number of pieces, their arrangement, arcs of fire, and ammunition supply, the projectile, etc. (all these being elements of the offensive power), is a function strictly subordinate not only to the destructive power of the ships that may eventually compose the enemy's line-of-battle, but also to the nature of the target offered by these ships.

In adopting a gun-calibre for the armament of a battleship, and in reproducing this calibre in the largest possible number of guns allowed by the installations, the object aimed at is to reply to the gunfire of the enemy's ships with a fire of at least equal intensity, but it is also sought to produce upon the hostile ships certain *effects* of absolute or partial destruction.

Given the fighting range, which is universally agreed upon at the present time as 8,000 to 10,000 metres (8,750 to 10,950 yards), the problem as to what projectile and consequently what calibre to adopt assumes the form of an attempt to ascertain the perforation at these distances, of the armour protection of the most modern foreign ships afloat or projected.

Here we come into contact with an extremely controversial question, and I think it will be useful for me to throw a little light upon it. Ballistic experiments enable us to determine the

lowest calibre in the rising scale at which the perforation of a given armour-plating, *i.e.*, the *desired effect*, can be realized. It is obvious that in ascending the scale all higher calibres will produce this effect, *a fortiori*, and the question at once presents itself whether this surplus power is necessary or even advantageous. Judging by a mere examination of what is taking place at the present time in almost all navies, one would be tempted to reply in the affirmative, for they seem to be engaged in a record-breaking competition to increase the calibre; they are adopting the 34 or 35 cm. (13.4-in. or 13.8-in.), and are quite prepared for still bigger monsters.

To anyone who, like myself, firmly believes that experience alone is a sure guide in such matters, resistance to what is almost wholly a sentimental craze, interpreted among the Naval Powers by absolutely unproductive squandering of money, becomes an absolute duty. Now, firing experiments, as conclusive as it is possible to make them, have been carried out in France, upon most methodical lines, against the hull of the "Iéna," and these proved beyond all possibility of refutation that the 305 mm. (12-inch) projectile was amply sufficient to produce, at 8,000 to 10,000 metres (8,750 to 10,950 yards) range, the necessary effects to put any modern ship out of action.

In the present state of naval construction, and without prejudging future events, the 305 mm. (12-inch) gun is therefore the one with which our ships of the line ("*bâtiments de combat*") should be armed. The adoption of a higher calibre is quite a mistake.

This conclusion is a tremendously important one, for since the weight rapidly increases with the calibre, as do also the difficulties of working the guns, a lower calibre represents, *caeteris paribus*, a higher rapidity of fire, a larger supply of ammunition, a greater number of guns in action, etc.—all factors having a decisive influence upon the result of a battle.

Thus, if we also insist upon copying our neighbours and adopting a 340 mm. (13.4-in.) gun, we shall be sacrificing certain precious elements of success in order to comply with the timorous suggestions of those who, instead of enlightening and instructing public opinion, allow themselves to be led by irrational impulses.

Once again, the precious teachings of experience must not be forgotten: the choice of a higher calibre than 305 mm. (12-inch) could have no other justification at the present time than the desire "to do the same as others do." Several wrongs do not make a right.[1] It is the same with nations, and, besides, who knows exactly by what suggestions they are influenced?

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[1] "Dix hommes qui se trompent n'ont jamais fait une verité."

It is true it may be objected that the firing experiments upon which I am relying, though they are valid for the present fighting range of 10,000 metres (10,950 yards), would not be so for greater distances. It is easy to reply that there exists necessarily a maximum limit to the continual increase of the fighting range, and that it has very nearly been reached. The mean distance of the horizon is 11,000 metres (12,000 yards), beyond which an enemy's ship begins to disappear from sight below the horizon, thus diminishing the effective target and the probabilities of hitting it.

So far, I have alluded only to the units of the battle-fleet; I have done so advisedly, because the armoured ship of the line is, to use the traditional and vigorous English expression, the "man-o'-war." Upon her alone will depend the fate of the battle. The other pieces in the game of war—torpedo boats, submarines, etc.—whose rôle is accessory and accidental, are numerous enough at present, and the provisions for replacing them are amply sufficient.

I must, however, point out a regrettable omission. It does not seem to have ever occurred to anybody to suggest building a single vessel of the special type known as the scout.

Now every battle force, on the sea as well as on land, needs to be supplied with intelligence. The function of what is called "reconnaissance" is an essential one, for by means of it the preliminary stages of a battle are regulated, and on these preliminaries the ultimate result of the battle may largely depend. For carrying it out a special class of ships is provided; they are of great speed, and in them everything else has to be sacrificed to mobility, for the intelligence which they have to furnish to the Commander-in-Chief is of exceptional importance. This intelligence, in fact, relates to the position and movements of the enemy and, consequently, is of great value in preparing for battle. Hence, it is easy to understand why Mahan said that, in the whole course of history, Naval Powers at war have never had sufficient scouts.

These special ships, whose displacement of 3,000 to 5,000 tons is only fixed by the necessity of making headway against rough seas, are commonly called "scouts" at the present day.

Whilst Germany has already in commission or building a fleet of 35 fast scouts, England more than 60, Austria four, Brazil three, the United States three, Italy three, and Japan five, the French Navy possesses not a single one—not even one projected.

It is said, indeed, "we are first of all building the battle fleet, which is indispensable to us; we shall see about the scouts later on." This observation contains an error in reasoning, and a still greater error against the principles of the art of war, which I cannot too emphatically point out. A battle fleet which cannot obtain intelligence is like a blind man, exposed to the

worst surprises. This situation demands our attention all the more urgently because the worse than precarious resources of a decadent mercantile marine would not enable us to improvise its vessels as auxiliary scouts.

To my mind the question is so important to the higher interests of naval warfare that I should consider it preferable, if that were absolutely unavoidable, to reduce slightly the construction of battleships in order to hasten forward the building of scouts.

Each of the new squadrons should, in a word, be completely ready when it commissions for service, both as regards the line of battle and as regards scouts for carrying out the work of reconnaissance.

Finally I seize the present opportunity to insist, once again, on the correct interpretation which should be given to the expression "naval forces."

The unit of force is *not* the ship of the line, but the *squadron*, composed of the *line of battle* and the light cruiser division. Consequently the fleet should be reconstructed squadron for squadron, and not ship for ship; considerations of homogeneity (as complete as possible), armament, speed, manœuvring qualities, seagoing endurance, etc., which must never be lost sight of, render this an imperative obligation.

What superior results, in particular, could one hope to obtain from armaments of 34 cm. (13.4-inch) guns, which, *in the same squadron*, would be associated with others composed of 30 cm. (12-inch) guns? If, in the spirit of imitation, and simply in order to be in the fashion, the calibre is to be increased at all hazards, I earnestly beg that, in any case, this shall not be done until the squadron of "Jean Barts" has been completed. Otherwise we shall be forced to acknowledge the inability of the French Navy to submit to the discipline of the productive principle of homogeneity.

THE MOBILIZATION OF THE FLEET.

The fleet once constructed, a new and not less important problem presents itself—that of its plan of mobilization. The complexity of this problem cannot be over-estimated. The example afforded by the Russo-Japanese war convinced even the most optimistic as to the suddenness with which hostilities will break out in the future. This danger demands, therefore, that modern naval forces shall be maintained constantly in the most perfect state of preparedness possible; in a word, their mobilization must be permanent. The permanent commissioning of all the units which have any real fighting value is not only a condition of the immediate operations of warfare; it is equally a condition of sound preparation for such operations.

The old system of reserve, which was justifiable when the warships (sailing vessels, or the earliest screw steam-vessels, or

even armoured frigates) were of very simple design, became a complete failure from the day when our complex ships, furnished with numerous and delicate organisms needing constant attention, were first commissioned for service.

And it is not the least of the mistakes made by the French Navy that it endeavoured to maintain at all costs an institution which was incapable of being adapted to the new naval arm. The ships that have suffered the penalty of an early death as the price of this ill-omened obstinacy are past reckoning. In this connection the most suggestive case of the "Du Chayla" may be quoted—the sole survivor of a whole class of protected cruisers, which owes her exceptional good fortune entirely to the fact that she has never been placed in reserve during the whole of her long career. Such a fact, among many others like it, should afford sufficiently convincing proof for anybody.

But the mobilization of the whole active fleet necessarily involves increased financial charges; the enforced counterpart to this should be the most careful weeding out of all superfluous expenditure, or even that which is not primarily requisite. The plan of mobilization is, in fact, nothing more than the best compromise between contradictory exigencies; its study forms the true basis of the financial equilibrium of a Navy. In order that this study may be productive of good results, it must proceed upon a strictly methodical system, and there is no better one than the choice of a concrete plan of operations. In this case what has to be done is, I repeat, to prepare a "side" in the game of war, to do which it is necessary to have the pieces (which in this case are naval units) ready in the "decisive position" for the "decisive moment." It will be realized that such an undertaking will immediately bring into clear contrast those pieces which are of value, and those which, though they may be useful in peace time, would not represent the smallest accession of any force whatsoever when it comes to real action, and which, in that case, ought inexorably to disappear. Just as Napoleon was always asking the question, "If the enemy were to appear from such a direction . . . ," so we must be always asking, "If we found ourselves at war to-morrow, what useful rôle should we assign to such a unit?" When a plan of mobilization is studied, in short, each special service, squadron, school, flotilla, etc., must not be examined apart from, and without regard for its relationship with the others, but all the parts that go to make up the machinery which constitutes the plan of operations should be studied as forming a single whole. Certain among them of which one might sometimes be tempted to desire the preservation as isolated pieces, will appear valueless as parts of the general organization.

Furthermore, important economies will be realized by following this logical method: the concentration of schools, so happily ordered by the Minister recently, has enabled 12 lieutenants, 26 sub-lieutenants, and 500 men to be returned to

the general service. It has made it possible, without any additional expenditure, to constitute a squadron of cruisers; a sound method, inspired by the principles of war, has resulted immediately in an increased return of military efficiency for the financial effort put forth by the country.

To be complete, the plan of mobilization must not merely fix the number and quality of the units which are to be commissioned in peace time; it must also determine their bases of operations, and, *ipso facto,* must include a plan of concentration.

We are beginning in France (still rather timidly it is true) to turn our backs on the erroneous idea which led us to scatter our naval forces—both first-line and secondary—along the entire coast line. The various elements of naval power ought, on the contrary, to be concentrated at a few judiciously selected strategic points; no other consideration should be allowed to influence this selection except that of the thorough and prompt execution of the war plans. If this has been done, the distribution of the naval forces in peace time is, for the initiated, a kind of photographic reproduction of the solution to the concrete problem of foreign policy.

The mobilizing plans of the British Navy have always provided us with striking examples of the value of these principles. At the time of strained relations between England and France, the main force of the former was concentrated in the Mediterranean. The Anglo-German difficulties, on the other hand, having had the *Entente Cordiale* as a corollary, led to a reinforcement of the squadrons in the North Sea.

An Admiralty thoroughly alive to the value of the constant teachings of experience knew how to make an infinitely pliant instrument of the plan of mobilization, adapting it wonderfully to the necessities of the moment.

This shows that, in such a matter, there cannot be an absolute solution applicable to all cases. As regards ourselves, animated discussions have been started as to whether our naval forces should be combined in the Atlantic or in the Mediterranean. The debates on this point have been unprofitable, for in order that they might be of any value, the champions of the opposite views would need to have been acquainted with the numerous factors of the concrete problem—who would be our probable enemy or enemies, who our allies, the terms and scope of these alliances, the extent of their co-operation, etc., all of which are matters that chancellories are not in the habit of divulging.

I am induced myself to formulate hypotheses, and their greater or less resemblance to what may really happen does not detract from the value of my exposition, since, once again, we are developing primarily a working method.

Suppose we are reduced to our own resources against a single eventual enemy, say Germany, or suppose we can count upon the support of England; suppose again that the German Empire

is itself isolated, or suppose that it has Austria and Italy at its back, or only one of these allies; the mobilizing plans of the French Navy cannot be the same, whichever may be the positive *casus* among these complex eventualities. On the other hand, we must not lose sight of our time-honoured interests in the Mediterranean, nor of the peculiar difficulties of France owing to her geographical situation with two distinct seaboards.

The naval history of France is also the history of proverbial difficulties in uniting her Mediterranean and Atlantic Fleets. This long experience shows us the necessity of a clear and definite choice based upon a thorough investigation of the concrete case.

As far as it is possible to form an opinion, for the moment at any rate, the present concentration of our main forces in the Mediterranean meets the requirements of our present policy, and conforms to the state of affairs on the European chessboard.

THE CONSTITUTION OF THE PERSONNEL.

In the military art a very complex value is rightly attached to the notion of forces; the extent of this complexity is still greater in the naval sphere, where the matériel has at all times, and especially in the modern Navy, represented an infinitely greater factor than it has in the Army. But the matériel, however high a degree of perfection it may attain, is not sufficient to constitute "force" without the element that imparts life to it and which represents *moral force*—the personnel.

We need only remark that the constitution of the fighting personnel should be the object of constant attention on the part of the authorities, and this attention will never appear to be great enough if we will only try to imagine the decisive moment of battle, when, for a space of hardly more than a few minutes, the destinies of the whole nation depend upon the moral strength or weakness of a few of her sons, viz., the leaders of the men.

All the efforts of peace time will then be directed to the constitution of a corps of officers, young and vigorous in body and mind, who, from the moment when they first enter the service until they come to retire, shall hold firmly to that enthusiasm and confidence of success; in a word, that sacred fire of inspiration, which brings forth prodigies.

These conditions, necessary as they are in all countries to every organized military corps, are still more imperative in a democracy, where, by the very nature of things, no discretionary power can be allowed to intervene to make a selection, and where the process of selection consequently necessitates a collection of rules of perfect equity in order to facilitate the rise of the most worthy to the highest posts.

This is a particularly delicate point, upon which I feel bound to lay special stress, for the philosophy of it does not seem to have been comprehended, especially in France. In a

monarchy it is the prince's personal prerogative to select the chiefs to whom he delegates a part of his supreme command. In entrusting him with the permanent care of defending them, the people have also given him certain prerogatives as a necessary concomitant. If he performs his task well, his very varied resources, as well as the continuity of his functions, enable him to know and to promptly bring forward those personalities whose military qualities appear to him to mark them out for the superior posts.

History warns us that we must not be astonished if these choices do not always prove to be happy ones. "To err is human," but the principle remains the same, and it must not be forgotten that the sole Commander-in-Chief is always the prince, the subordinates merely acting as his delegates and being directly responsible to him, whilst he assumes the entire responsibility to the nation.

There is nothing like this in a democracy, where every citizen of the State has, theoretically, an equal right to aspire to the highest offices, where there is no permanent controlling power to institute a rigorous system of selection, and where such a system consequently appears to be all the more indispensable.

It is, moreover, important that the constitution of the personnel should be removed from the arena of the struggles and influences of politics, as well as from the changing caprices of ephemeral governments. Without these imperative conditions there can be no moral health for a military corps nor guarantees of security for a democratic régime.

These desiderata may be summed up in a brief formula: in any well-founded military system one single pre-occupation exists (and that a veritable obsession)—*viz.*, preparation for war; all minds are set at rest by a permanent guarantee that the claims of *every officer* will be subjected to a thorough and frequent examination with a view to reward, encouragement, or censure at all points of his career. If these moral conditions are supplemented by sufficient material advantages, the country will be able to count upon a corps of exceptionally vigorous officers and await events with full confidence—the call to arms may sound; its summons will be heard without alarm. The conditions which I have just enumerated are still more necessary when the Navy is concerned, for here, owing to a somewhat abnormal mode of existence, fresh elements enter into the calculations.

"The Frenchman has a passion for equality," said Bougnot. This passion finds its expression in our times in what is called assimilation. Every corps, no matter what its purpose and function, aspires to the same advantages and claims them with avidity. The thought that others might benefit by certain prerogatives of pay, pension, precedence, honour, etc., which are not enjoyed in one's own case is insupportable to every Frenchman, especially if he belongs to a strictly constitutional

organization. And yet no conception is more absurd than this one, nor more opposed to the reality of things.

To keep within the limits of our discussion, what other profession is there that could be compared for a single instant with that of the sailor?

The obligation of being always ready on receipt of an order by telegram to quit home and country in order to cross the seas, to go hand-in-hand incessantly with danger, to live on the hull of a quivering ship, makes of those on whom it falls a unique class of abnormal citizens to whom the nation, if for no other reason, owes special favours. This obligation of leading a sort of nomadic existence brings with it as its natural consequence the frequent abandonment of private interests as well as the loss of all opportunity of indulging numerous tastes and ideas allowed to other professions: it has as its indispensable corollary, certain special advantages. Is this truth, which is recognized in all other countries, to remain uncomprehended in France alone? The eternal law of supply and demand will, however, act as a regulating instrument, for the supply of naval officers would very soon cease if it ever came to be an accepted fact in this country, that quite as brilliant—I may even say quite as honourable—a career is open to the man who stays quietly at home toasting his toes by the fire and always surrounded by his family, as the man who goes forth to be drenched, morally and physically, in the spray of the ocean.

But, in order to have the corps of officers vigorous in body and mind—which is indispensable to the constitution of a great navy—it is not sufficient merely to promise them adequate material advantages; it is no less essential to give them a hierarchy which shall guarantee rapid passage through the lower ranks, with a view to bringing them as soon as possible to close grips with real responsibilities. Command being the ultimate aim of every naval officer, the naval career is only a long course of preparation for it.

The most essential condition to be fulfilled in order to attain this end is to keep the officers constantly employed on sea-service. Proficiency in the sea-faring profession, in fact, can only be attained by the frequent handling of ships, and this is incompatible with prolonged sojourns ashore which, furthermore, have a demoralising effect.

The immediate conclusion which follows from this is that a close relationship exists between the numerical importance of the fleet and the staff of officers. It may appear extraordinary that I should state a truth which is so obvious to any intelligent person; it seems evident, in fact, that the number of officers should be proportionate to that of the ships. Well, up to the present moment, in France, the projected fleet has dwindled from 52 ships of the line to 28, although not a single alteration is contemplated in the law of 1896—the present charter of naval officers. Without wishing to pose as a systematic admirer of

everything that is done in other countries, one is nevertheless compelled to admit that the navies of our rivals—Germany, England, etc.—proceed more logically and methodically. Overcrowding the list of officers has, I repeat, the grave inconvenience of restricting these officers' opportunities for going to sea, thus impairing their professional capacities, and, in addition, impeding their advancement.

When officers remain in shore appointments on the average for eight years out of fourteen the vitality of a navy is seriously compromised. To fix the numbers in proportion to the real needs of the fleet; to establish a ratio between the superior appointments and the subordinate posts, so as to ensure rapid promotion; to provide facilities for retirement for officers prematurely worn out, morally or physically, by the strain of what is often an exacting profession; to offer brilliant prospects to those who remain, so that much may be demanded of them; in short, to be keenly alive to the imperative necessity of maintaining the sea-going corps in a perpetual state of activity and youthfulness—such are the main principles which should inspire the constitution of a corps of officers for a navy.

THE PERSONNEL OF THE LOWER-DECK.

Although I have dealt with the constitution of the officers first, that of the crews is no less important. I will not say much on this point, as the reforms recently introduced by the Minister, and which meet the needs of the case as far as it is possible to do so, will absolve me from entering into a lengthy discussion. The modern navy has developed into an industrial organization; each of the vessels composing it is a veritable workshop, where representatives of every trade are to be found.

By systematically ignoring, as it has done hitherto, the vast resources which the innumerable industries of the country could place at the disposal of the Navy, the maritime conscription law must eventually have brought about a crisis in connection with the personnel of the lower deck. The case against the naval conscription system (*inscription maritime*), as it has hitherto existed has been stated too often and too eloquently to necessitate any return to it on my part. Its irremediable defect consisted in the obligation which it imposed upon us to take, to the exclusion of all others, large numbers of men who were sailors in name, but who often only followed a seafaring profession on paper. The new recruiting law, which has been laid before Parliament, and the rapid passing of which is highly to be desired, will furnish the Navy with a pliable instrument perfectly adapted to its manifold requirements. It will enable a levy of the professional element to be made upon populations actually following a seafaring life, *i.e.*, of men who have been inured from their birth to the vicissitudes of navigation, and whose co-operation will always be invaluable in ships of war; but in also making the widest possible appeal to all professions

—engineers, stokers, electricians, draughtsmen, etc.—it will enable a very considerable reduction to be made in the sacrifices hitherto imposed by the necessity of transforming (always at great expense) fishermen, or self-styled fishermen, into specialists.

In conclusion, it will suffice in order to estimate the moral value of the new law, to point out that, by its operation, 45,000 men, who have hitherto ben placed at the sole disposal of the Navy Department, who have not been employed by that department, who have been ignored by the Army, and who have thus made no response to the roll-call of the "armed nation," will be rendered available for the defence of the country.

The disappearance of such a striking anomaly should furnish sufficient justification for the passing of the law. Who would then be bold enough to declare that there are any who could remain idle when every son of France is responding to the summons of the country in her hour of danger?

A law framed upon sound principles and adapted to the complex necessities of a modern Navy is not in itself sufficient; it needs to be completed by a scheme of constitution for the crews which shall guarantee an honourable career to those who prove themselves meritorious, and encourage them to remain in the Service. It is not only for the supreme purpose of battle that an experienced personnel is to be desired; the solution offered by a "specialist Navy" is pre-eminently an economic one.

Undoubtedly success in battle will be the more readily attained, other things being equal, if the ships have highly expert gunlayers behind their guns, and, speaking generally, the more experienced is the personnel which has charge of all the various parts of the ship. But when I remind you that the training of a gunlayer, for example, costs the State several thousand francs, you will at once realize what an enormous waste of money is inevitably incurred by an improvident naval institution that does not know in good time how to make the incomparably smaller sacrifices which are necessary to retain in the service the specialists of its personnel.

Here, again, method and foresight are the indispensable guides of naval organization.

THE CONSTRUCTION OF THE FLEET.

There are an infinite variety of systems for the construction of a fleet, comprised between two extreme methods, one of which depends solely upon private industry, whilst the other relies entirely upon the State workshops.

The two extremes are equally bad; the first because it does not give a Navy any guarantee against a combine or other form of coalition of the constructors for the purpose of bringing about a purely arbitrary increase in the net cost of the warships,

the second because, being a State concern, it is vitiated to a great extent by all the inherent defects of collective organizations, which are enemies of progress, opponents of that fruitful activity engendered by friendly competition, and destroyers of healthy energies.

For anyone who has lived near the naval dockyard the question is settled in advance, and it seems extraordinary that no one has ever ventured to attempt to institute a comparison between the cost of the battleships built by the State and those built in private yards.

Figures are useless in such a case; as a matter of fact, in order to be convinced, it would be quite sufficient to pay a visit on the same day to a State workshop and a private one. By so doing one will get a panoramic view of a busy hive of industry following upon a picture of depressing and slothful indifference.

Has it not been audaciously affirmed at one time or another, with a view to demonstrating, against all evidence, the economy (!!!) realized by national construction, that a State enterprise has no incidental expenses (!!!) In making such a statement it was completely forgotten that there is not a single organization in the world which does not have its bad debts, its unproductive outlays, necessitated by the very working of the machinery of the system. No industry, no trade, no human institution of any kind whatever is carried on without incidental expenses; the secret of success in everything lies in reducing them to a minimum, the corollary of which is the obtainment of the greatest possible value in return for the outlay involved.

The State will need to make every effort to inculcate these economic truths in its loyal citizens and servants.

Here, again, it is not the men who are at fault, but the institutions that have been erected without method. The dockyard workmen on many a critical occasion have given a foretaste of the amount of work they could turn out if ever their yards were organized with a view to productive labour.

The rational solution lies, then, between the two extremes, in a mixed combination utilizing at once the resources of private industry and those of State construction. Not only is it inadvisable, however, to multiply the shipbuilding yards, but it would be best to reduce them to a single one, where it would be possible to benefit from the large profits ensured by the concentration of energy in shipbuilding, in the purchase of material, in studies, in labour, etc., and above all by the facility for the industrial organization of the State works. By this means only, we shall have an instrument for regulating the charges of private firms. With this guarantee, I have a very decided preference for calling upon private industry to the greatest possible extent. I repeat that by so doing the country will realize considerable economy, saving of time, and profits of all sorts, owing to the free play of individual initiative. And

here again the State must abstain from all meddlesome interference on the part of its agents beyond the exercise of its necessary control. It is important to break as soon as possible with a custom that has been followed far too long in France, whereby, instead of making a full contract with the firm concerned for the complete delivery of a ship, like a customer dealing with a contractor, the naval administration meddles in all the details, issues partial orders itself, without taking any comprehensive view of the matter, and, in short, introduces the element of disorder into the construction, to the detriment of its own interests.

THE CENTRAL ADMINISTRATION.

The crowning of the edifice is assured by the organization of the Central Administration. The latter should fulfil the same functions as the board of directors in a commercial firm, and the drawing of this comparison will suffice to emphasize the whole primordial importance of the central administration. It is, in fact, from this Central Administration that what are called in military phraseology "the directives" take their origin; it is this organ, the veritable brain of the whole system, which starts the vast machine in motion.

It will be seen at once how thoroughly well weighed and considered the rules must be to which this administration has to conform.

Under penalty of suffering from congestion it will confine itself to supplying all the active branches of the Service with general instructions stated decisively and clearly enough to leave no doubt as to their meaning; the natural consequence of this will be a wide and productive system of decentralization, to the advantage of the port establishments. The task, regarded in its entirety, is already heavy enough. Unfortunately the duties devolving upon the Central Administration are far from having been so understood in the French Navy. The Ministry of Marine has too many water-tight partitions between the various departments, which act independently of one another, and aim at divergent purposes. The principle of subdivision into a large number of compartments is quite correct on a ship of war where the object is to minimize the damage sustained in battle, but it is fatal in administration. A natural tendency results from it to gradually absorb all business of any importance whatsoever, and to restrict action in the despatch of current business (although action is most necessary to a navy).

The abuse of what are styled "competent" omissions is also a naval malady. The best method for causing a scheme to miscarry nine times out of ten is to assemble a number of undisputed authorities around a green table; the product of their labours will be an inert and colourless thing, sometimes even a monstrosity, whilst any one of them, consulted individu-

ally, would have given an interesting expression of opinion. The *régime* of councils, committees, commissions, etc., all those wheels within wheels—which proffer advice without accepting responsibility—will always be an unhappy one. *They must disappear.*

There is only one really living system, productive of energy and action, and that is the one which is based upon the following principle:—

The Minister should be surrounded by a *very small number* of responsible heads of departments, who should be actual permanent inspectors with authority, as delegated by the Minister, to visit all places where it may be necessary to see that orders are carried out, to see that the various departments of the service are in good working order, to watch the progress of fleet preparations, etc.; but as against these duties they should have the necessary powers to apply *immediate* remedies to any defects discovered by them.

I simply and absolutely guarantee the speedy success of such an organization, especially if the Head of the Department and his immediate colleagues are constantly inspired by the spirit of the following motto:—

Order, method, foresight.

EVENTS OF THE MILITARY YEAR, 1911, IN THE ARMIES OF FOREIGN POWERS.

(Continued from April, 1912, JOURNAL, Page 515.)

RUSSIA.

(1) Military Expenditure—(2) Organization and Conditions of Service (*a*) *Composition of Army;* (*b*) *Staff;* (*c*) *Conditions of Service;* (*d*) *Reserves* —(3) Infantry—(4) Cavalry—(5) Artillery—(6) Engineers—(7) Aeronautics —(8) Other Arms and Departments (*a*) *Medical Services;* (*b*) *Intendance;* (*c*) *Supply;* (*d*) *Transport*—(9) Musketry and Small Arms—(10) Machine-guns—(11) Horses and Veterinary Services—(12) Education—(13) Communications—(14) Miscellaneous.

(1) MILITARY EXPENDITURE.

(*Sums converted at the rate of* 9.5 *roubles to the* £1).

Military Estimates for 1911, £55,950,918. Increase over those of 1910, £59,724.

1910.		1911.	Differences.
Ordinary expenditure	£50,601,720	£50,808,813	+£207,093
Extraordinary expenditure ...	5,289,474	5,142,105	− 147,369

The expenditure of the Ministry of War, which was distributed under ten heads in 1910, is now distributed under nine, the Department of the General Administration of the Cossack troops having been abolished and its business transferred to the Headquarter Staff and other departments during the reorganization of the Ministry of War in 1910. The nine heads now are: the Chief Directorates of Intendance, Artillery, Engineers, Military Educational Establishments, General Staff, Headquarter Staff, Military Sanitation, Military Justice, and the Chancery of the Minister of War.

The ordinary expenditure includes certain items, which would, in most countries, come under the Ministry of the Interior, *i.e.*,

The Corps of Gendarmes	£813,560
Expenses connected with the civil administration of Turkestan	£163,900

The chief change in the Intendance Department estimates for 1911 is the allotment of £601,000 for the training of reservists and militiamen—an increase of £575,000 from the amount spent in 1910.

The Artillery Department estimates show a reduction in the assignment for the re-armament of the field artillery, *viz.*: £482,000, as against the sum of £865,000, which was expended in 1910. This heading disappears from the estimates for 1912. The whole re-armament is stated to have cost the Treasury £16,968,000, a sum less than the estimate by £1,789,000, in spite of the purchase—not originally budgeted for—of shields and panoramic sights.

(2) ORGANIZATION AND STRENGTH.

(a) Composition of the Army.

The normal organization of the Army is as follows:—

Number of army corps	37
,, ,, infantry divisions	70
,, ,, rifle brigades	17
,, ,, cavalry brigades	58
Normal number of divisions in an army corps	2
,, ,, ,, brigades in a division	2
,, ,, ,, regiments in a brigade	2
,, ,, ,, battalions in a regiment	4
,, ,, ,, companies in a battalion	4

Summary of Peace Establishment.

—	Men.	Guns.
Infantry	815,022	—
Cavalry	138,611[1]	—
Artillery	192,629	3,904
Other arms and departments	63,739	—
Total	1,210,001	3,904

(b) Staff.

REORGANIZATION OF THE HEADQUARTERS STAFF.—The Headquarters Staff (*Glavni Shtab*) at Army Headquarters now consists of the following departments and sections:—

1. The Adjutant-General's (Dejurni-General) Department which deals with the establishment of officers, officials and rank and file; appointments and rewards; discipline; the issue of orders.

2. The Pension Department, which deals with ordinary and family pensions.

[1] Increased during 1911 by the addition of two squadrons of Orenburg Cossacks.

3. The Cossack Department, which deals with the civil and military administration of the Cossack armies, exclusive of questions regarding recruiting, mobilization and training.

4. The Asiatic Section which deals with the civil and military administration of Turkestan, and of certain districts of the Caucasus; the Khanates of Bokhara and Khiva; the instruction of officers in Oriental languages.

5. The Administration Section which supervises matters relating to the comfort of the troops (viz., officers' economic societies, N.C.O.'s messes, soldiers' shops and canteens); archives; personnel and pay of the Headquarter Staff and maintenance of its offices; map printing; staff book shop; petitions to the Minister of War; despatch of prisoners by march route and their escorts.

FORTRESS COMMITTEE.—A permanent fortress committee, consisting of six members under the presidency of the Q.M. General of the General Staff has been formed at Army Headquarters. Its duties will include the consideration of all questions relating to the construction and armament of fortresses, the organization of fortress troops and siege artillery.

STAFF OF INSPECTORS-GENERAL.—The recently appointed Inspectors-General of Cavalry, Artillery, Engineers, and Military Educational Establishments will be permanent members of the Selection Committee and will report annually on the 28th February to the Minister of War.

GENERAL STAFF.—The number of officers on the General Staff list is as follows:—

Generals 68; Lieut.-Generals 137; Major-Generals 200; Colonels 394; Lieut.-Colonels 153; Captains 224; total 1,176; add attached officers 61; grand total 1,237.

(c) Conditions of Service.

NON-COMMISSIONED OFFICERS.—The supply of the N.C.O.'s of extended service has long been inadequate.

It was recognized that substantial inducements were required to lead men to extend their service with the colours. Accordingly, in 1905, regulations were issued trebling the pay of N.C.O.'s of extended service, and ordering that, upon the expiration of two years' extended service, those who were suitable should be promoted to the rank of sub-ensign. Upon the completion of ten years' service, sub-ensigns might go to the reserve or national militia with a bounty of £106; upon the completion of 13 years' extended service, all sub-ensigns were to be discharged or transferred to the militia with a pension of £10 a year. In 1908 and 1909, arrangements were made with other ministries for the reservation of Government posts of an average salary of £30 to £40 per annum for all sub-ensigns discharged after ten to 13 years' extended service. It was further decided that they should be allowed a four months' furlough on full pay in the first, fourth, seventh, tenth, and 13th years of their re-engaged service.

The regulations have now been revised, and an attempt is being made to form a "second-class" of extended-service N.C.O.'s. The sub-ensigns at present serving will in future be styled "the first class." The idea is to provide eventually six extended-service N.C.O.'s (*viz.*, three of each class) for each company, squadron and battery. The position of colour-sergeant and of section commander will be filled by extended-service N.C.O.'s of the first class, if these are available; otherwise by extended-service N.C.O.'s of the second class; failing these, by serving conscripts.

The regimental schools, which trained N.C.O.'s for the position of sub-ensign, have been abolished and will be replaced by divisional schools.

The new second class will consist of under-officers and *yefreitors*, short-term conscripts and volunteers, who apply to extend their service and are approved by their commanding officers, and of under-officers and *yefreitors* of the reserve, who have left the colours not more than two years. Men of the second class, who have served two years as senior under-officer (section commander) in the same unit and have passed through the divisional school, may be promoted to the first class (sub-ensigns), if recommended by their commanding officers. The full complement of the second class will be 24,000. It was hoped to enrol 3,600 by the 1st October, 1911, 6,000 more in 1912, and to reach the whole establishment by 1915. The allotment of the men to districts will be carried out by the General Staff till 1913.

The inducements offered generally to men to re-engage are:—

1. Increased pay. Sub-ensigns during their first three years' service as such, £36 a year, and in subsequent years, £42.

N.C.O.'s who have been through the divisional school and fill the position of squad commander, £30 a year. Other N.C.O.'s £19 a year. Lance corporals (yefreitors) £13 a year.

2. Bounties. After 2 years' extended service £16.

After 10 years' extended service sub-ensigns, who have served not less than two years in that rank, receive £106; other N.C.O.'s and lance-corporals receive £53.

3. Permission to marry, married quarters and marriage allowances.

4. Pensions. A pension of £10 a year after 15 years' extended service and of £3 10s. to the widow, in the event of a pensioner's death.

5. Distinctions in dress. Advantages regarding clothing and bedding. Medals.

6. Leave. Two months in alternate years, except in the Pri-Amur and Irkutsk Military Districts, where N.C.O.'s will be entitled to 28 days a year, in addition to four months with free railway pass every third year.

7. Separate quarters for colour-sergeants and for each two senior N.C.O.'s.

8. The right, after five years' extended service, to a certificate of recommendation for civil employment.

It has been laid down that ordinary conscripts may, in future, be promoted to under-officer upon the completion of their first year's service, the qualifying minimum of service having been shortened from one year and nine months, as laid down in 1910.

PROVISION OF CIVIL EMPLOYMENT FOR SUB-ENSIGNS ON RETIREMENT.—Elaborate arrangements have been devised to provide sub-ensigns of ten years' extended service with civil employment on retirement. Such men will apply by the 14th October of the year in which they finish their eighth year of extended service, stating the class of employment they desire and one other district besides that in which they are quartered, in which they would like to obtain such employment. The district staff collate the regimental lists and send preparatory lists of candidates for each class of employment to the Headquarter Staff. The Headquarter Staff allots to each district candidates for a particular class of employment, in proportion to the number of appointments of that class allotted to the Ministry of War in the particular district. Finally, on the 28th February, the lists, in order of seniority of candidates for each class of employment in the district are published in district orders. New lists will be drawn up each year.

Arrangements have been made for seconding candidates from their units for six months (14th March to 14th October) in order that their capabilities may be tested in the particular class of employment they wish to take up. While undergoing this test, the sub-ensigns will receive regimental pay and allowances and, in the event of mobilization, will resign their acting civil employment within three days. On the conclusion of the test, they will rejoin their units, and the civil authorities will report to the district staff on their fitness or otherwise. If reported to be unfit, their names will be struck off the list of candidates for the particular employment. If reported to be suitable, they will wait for a vacancy on the list of candidates.

It was hoped to detach the first batch of sub-ensigns to be tested in various civil appointments by the 14th April, 1912.

On final nomination to a civil post, the sub-ensign will be freed from liability to rejoin in the event of mobilization.

(d) Reserves, etc.

OPOLCHENIE OR IMPERIAL MILITIA.—It has been decided that in future the Opolchenie may be called out "in time of war," instead of, as formerly, only "under exceptional circumstances in time of war." The enrolment and calling out of the men for the Opolchenie will be carried out on similar lines to that of the

army reservists. In certain previously designated districts, the Opolchenie will be called up on mobilization simultaneously with the reservists; in other districts mobilization for the *Opolchenie* will commence after the reservists have rejoined the colours. All expenses connected with the mobilization, clothing and equipment of the Opolchenie will be borne in future by the Central Government, instead of, as formerly, by the Local Governments.

OPOLCHENIE IN THE FAR EAST.—Detailed instructions have been issued for the registration of the Opolchenie, whom it was decided last year to call up for training in the Amur and Littoral Provinces during the years 1910-1912.

CONVOY DETACHMENTS.—The convoy commands, which are chiefly used to escort prisoners, have been re-organized. The whole number in the Empire now amounts to 530, with a strength of 100 officers and 11,738 men.

(3) INFANTRY.

TOOLS.—The number of tools will be raised, as funds permit, to the following proportions:—

INFANTRY COMPANY.—Carried by men: 140 small spades, 30 small axes, 30 small picks. Carried in first line transport: 16 sappers' spades, eight axes, six picks, one crowbar.

MACHINE GUN DETACHMENT.—Carried by men: 35 small spades, eight small axes, eight small picks. Carried in first line transport: eight sappers' spades, four axes, eight picks.

(4) CAVALRY.

ORGANIZATION.—The Amur Cossack Cavalry Regiment will no longer form part of the Ussuriski Cavalry Brigade, but will be attached to the 5th Siberian Army Corps.

The 4th Orenburg Cossack Regiment has been raised from four to six squadrons.

The Turkoman Irregular Horse Division (three squadrons) has been re-named the Turkoman Horse Division. Its captains have been placed on the general list of the Cavalry of the Line for promotion to lieut.-colonel.

DEPÔT CAVALRY.—The supervision of the training in the depôt cavalry regiments, which train remounts, and in time of war prepare drafts for the regular cavalry, has been handed over to the Director of Army Remounts.

TOOLS CARRIED BY CAVALRY.—The scale of tools in the cavalry regiment will be raised, as funds permit, to the following:—

	Carried by Men.		Carried in Transport.		
	Small spades.	Light Cavalry pattern axes.	Sappers' spades.	Light axes.	Light picks.
Squadron	20	20	2	2	—
Machine-gun detachment of 4 guns ...	14	4	3	—	3
Do. do. 8 guns ...	28	8	6	—	6

COSSACK SADDLE.—The regulation pattern Cossack saddle has been altered. The changes are slight and the 1895 pattern can be adapted.

(5) ARTILLERY.

GUNNERY RULES.—New gunnery rules (with an explanatory memorandum) for three-inch Q.F. field, horse, and mountain artillery, have been issued to supersede those of 1904. (vide Arty. Circular No. 22/1911). These rules contain instructions for the "new" practice with short fuze against hidden targets, and the Artillery Committee direct that special attention is to be paid in order to arrive at an estimation of the battery commander's power to direct such fire without the assistance of observers. An accurate record of the hits is to be kept in order to prevent officers from entertaining an exaggerated idea of the efficacy of fire at hidden targets.

INSPECTORS OF ARTILLERY IN ARMY CORPS.—Inspectors of artillery of the rank of lieut.-general, or major-general, have been appointed to each army corps. They will be responsible for the technical training of the artillery of the corps, and will report to the army corps commander annually on the 15th December. They will rank as divisional commanders.

COMPETITIVE FIRING.—Rules have been issued for firing competitions which are to take place in all practice camps upon the conclusion of the summer practice. The guns will be divided into four categories for the purpose of the competition :—

1. 3-in. Q.F. field (and horse) guns (1900 and 1902 models) with telescopic sights.
2. do. do., without telescopic sights.
3. 3-in. Q.F. mountain guns.
4. 48-line field howitzers.

Two days before the date fixed for the competition, the camp commandant will select, to represent each battery, a gun detachment of one N.C.O. and four gunners from a nominal list of detachments for each gun in the camp submitted by battery commanders.

HORSE-MOUNTAIN ARTILLERY.—The newly raised Caucasian Horse-Mountain Artillery Division at Alexandropol has been allotted to the Caucasian Cavalry Division.

ARTILLERY REMOUNTS.—Artillery units in the districts of European Russia and the Caucasus will in future maintain the last annual batch of remounts *extra to establishment,* for one year, during which period they will be broken in and trained.

TOOLS.—The scale of tools carried by batteries will be raised gradually as funds permit. All artillery tools will be carried on vehicles. The scale varies for field, howitzer, horse, horse-mountain, mountain and heavy batteries. The field and horse batteries will be equipped as follows :—

—	Sappers spades.	Heavy axes.	Heavy picks.	Crowbars.	Saws.
Field battery	40	24	16	4	4
Horse battery	24	18	12	3	3

(6) ENGINEERS.

ATTACHMENT OF INFANTRY OFFICERS.—The number of infantry officers, annually attached to engineer units for one month for instruction, has been increased from the former scale of a single officer per brigade to one field officer from each division or independent brigade and one company officer from each regiment. One private from each battalion will also be attached for instruction.

PROJECTOR SECTIONS.—Equipment tables have been published for the 60 or 75 cm. electric projector sections of an engineer battalion. The projector is carried on a six-horse wagon and the dynamo on a four-horse wagon. The transport also includes four two-wheeled one-horse carts. Some of the sections are horsed in peace and others will be horsed on mobilization.

CABLE SECTIONS.—New equipment tables have been issued for the cable section of the telegraph company of an engineer battalion. The telegraph equipment now comprises four stations with 17 miles of heavy field cable. The telephone equipment consists of four field telephones with nine and one-third miles of line, in lengths of not less than two miles, five and one-third miles in shorter lengths, and 1,200 yards of river cable. The signalling equipment includes two heliographs and two lamps.

(7) AERONAUTICS.

SUPERVISION OF AERONAUTICS.—In order to superintend aviation in the army the Electro-Technical Section of the Engineer Directorate at Army Headquarters has been strength-

ened, as a temporary measure from April, 1911, till the end of the year 1913, by the addition of four engineer officers, two of whom will act as purchasers of matériel.

An Aeronautical Committee has been formed. It consists of a President appointed from the Engineer Committee by the Minister of War, seven permanent and four or more advisory members. The permanent members are the four engineer officers mentioned above, the Secretary of the Committee, also an engineer officer, the Commandant of the Officers' School of Aviation and the Commander of the Air Battalion of that School. The advisory members will consist of an officer of the General Staff, an artillery officer, a mechanical engineer from the Engineer Directorate and a naval officer nominated by the Minister of Marine. The work of the Committee will consist of the examination of the new inventions with a view to their acquisition, the conduct of experiments, arrangements for the manufacture of matériel, the consideration of regulations for and the equipment of air units and the study of the technical development of aeronautics in Russia and abroad.

The age limit for the employment of officers in aircraft has been fixed at 45 years for aeroplane pilots, and 58 years for officers in dirigibles.

(8) OTHER ARMS AND DEPARTMENTS.

(a) Medical Services.

HOSPITAL ACCOMMODATION IN PEACE.—Hospital beds are provided for the various units of the Russian army in peace on the following scale:—

Four-battalion infantry regiment	84
Six-squadron cavalry regiment	30
Battery of artillery	8

(b) Intendance.

REORGANIZATION OF THE INTENDANCE DEPARTMENT.—Regulations have been issued with the object of improving the personnel of the Intendance Department, which superintends the pay, clothing, feeding, transport and much of the equipment of the Russian Army, and budgets for funds for the purchase of remounts. As formerly, the personnel will consist of officers who have passed the Intendance course, officials, a few retired officers and sub-ensigns, but promotion will depend on education and efficiency, as attested in confidential reports.

The work of the Department is divided into five sections—administrative, office, supply, technical and purchasing, and the personnel is encouraged to specialize. The administrative section will be filled by officers, who have passed the Intendance course and have been attached subsequently for periods of six months each to a district or army corps Intendance Staff, to one of the technical Intendance establishments and to a purchasing committee.

It is estimated that three years will be required to establish the new system. To assist in the process of weeding out the old personnel, an age limit has been introduced and all officers or officials must retire on reaching the age of 63.

INSPECTORS OF TRANSPORT.—Intendance officials with technical training have been appointed to take over transport produced by private factories, and to carry out periodical inspections of the vehicles with the troops or in Intendance depôts.

DIVISIONAL AND ARMY CORPS INTENDANTS.—The creation of the new appointment of Divisional Intendant in peace and the widening of the sphere of activity of the Army Corps Intendant bring into existence in peace the decentralization, which past experience has proved to be necessary in war.

The Army Corps Intendant will, in future, superintend in peace the supply of food and clothing to the army corps. He is responsible for the maintenance, in good condition, of the regulation quantity of mobilization stores and transport. He will assist at all trial mobilizations in his army corps and will annually inspect the transport of one or more units. He will make preparation for the feeding of the reservists on mobilization in the district occupied by his army corps. The Army Corps Intendant is, as a rule, a colonel or major-general, and is assisted by a staff of two subordinate officers. The post of Divisional Intendant has been created, and officers of the rank of colonel have been appointed to each cavalry and infantry division, and of the rank of lieut.-colonel or colonel to each rifle or independent cavalry brigade.

The Divisional Intendant is directly responsible to the General Officer Commanding the division, and performs in the division duties analogous to those carried out by the army corps intendant in the army corps.

(c) Supply.

REGIMENTAL ADMINISTRATION.—The experiment of relieving combatant officers of the work of supervising administrative detail by the attachment to each regiment of officials of the Intendance Department has been continued throughout the year.

SUPPLY MAGAZINES.—Intendance magazines or supply stores will in future be classed according to the average quantity of supplies they contain during the year :—

—	Class of Magazine.			
	I.	II.	III.	IV.
	Not less than tons.			Less than tons.
European Russia and Caucasus ...	5,323	1,064	532	532
Other Military districts...	3,952	807	403	403

CLASSIFICATION OF STORES.—Equipment stores will in future contain :—

1. Mobilization equipment for reservists on rejoining the colours.
2. War equipment to replace equipment condemned during a campaign and for improvized units.

The commissariat magazine and depôts will contain a certain peace reserve, and also war supplies for the use of field and fortress troops on mobilization.

Articles supplied by the Artillery Department are divided into :—

1. Mobilization equipment for the reservists on rejoining. This is stored with the units in peace.
2. War equipment to replace stores used and condemned during a campaign. This is stored in peace in district and local artillery depôts.

Articles supplied by the Engineer Department are subdivided and stored in peace on principles similar to those of the Artillery Department. The medical store depôts, which supply the army, navy and certain civil establishments in peace, will store medical and veterinary equipment for mobilization and war.

(d) Transport.

TRANSPORT CONSCRIPTION.—Certain alterations and additions to the regulations for the collection of transport from the civil population on mobilization were issued during the year. In some of the less densely populated districts of European Russia and generally in Trans-Caucasia and Siberia, a modified form of conscription will be adopted. Settlers in Trans-Caucasia, the Far East and Central Asia are exempted from the operations of the conscription during the first five years subsequent to immigration. A general census of transport animals, vehicles and horses will be taken throughout the Empire every eight to ten years. A supplementary count of horses of superior quality will be made once in the interval between the years of the general census, in districts which are of importance from the point of view of mobilization. The transport in each district will be registered and classified according to quality, so that an accurate idea can be formed of what will be available on mobilization in each district.

CAMELS.—Rules have been laid down for the guidance of camel purchasers on mobilization. Camels should be able to carry 480 lbs. and should be between the ages of six and 15 years.

PURCHASE OF CARTS.—The prices that will be paid for carts taken over on mobilization in Asiatic Russia have been published. Vehicles are classed as carts with shafts, and 2-horse, 3-horse, and 4-horse carts with poles. Thirty to fifty per cent. higher prices are given for vehicles with iron axles.

MECHANICAL TRANSPORT.—A Mechanical Transport Instructional Company has been formed to train officers and men in

the use of motor vehicles. It is commanded by a lieut.-colonel and has an instructional staff of seven officers.

(9) MUSKETRY AND SMALL ARMS.

APPENDIX TO THE MUSKETRY REGULATIONS OF 1909.—This appendix issued in Army Order 198 of 1911, contains instructions for the conduct of field practices by small units, with the object of training junior commanders to adapt the theory of the control of fire to the solution of simple tactical problems. Infantry units will carry out at least three practices. Two of these will be by sections, one with the section at peace strength, and one at war strength; the third practice will be by a company at peace strength. Fifty rounds are allotted.

Cavalry units will carry out one squadron practice, for which 15 rounds are allotted.

Infantry will carry out at least one practice yearly in firing by night, and one in firing in movement during the advance to the attack.

INSPECTOR OF MUSKETRY.—The duties of the newly-appointed Inspector of Musketry are (*a*) to exercise a general supervision by means of inspections over the conduct of musketry practice in the army; (*b*) to ensure the proper care of all small arms, whether fire or side arms, machine guns and ammunition. He is responsible for the Officers' School of Musketry, and is an advisory member of the Artillery Committee, and *ex officio* President of the Small Arms Section of that Committee. He reports annually on the 14th January to the Minister of War.

The appointment carries rank equal to that of an army corps commander and the Inspector is allotted an inspectional staff of three Major-Generals and an office staff of two officers, one official and three clerks.

INFANTRY RANGE FINDER.—Three prizes of £2,000, £1,000 and £500 are offered to the inventors of the three best range finders for use with infantry, provided so many as three are submitted by the 14th February, 1913, fulfilling the required conditions. Each inventor must send in five instruments. The apparatus must not weigh more than 5 lbs. It must admit of the taking of observations from a single point, without measuring a base; the error in judging on stationary objects under favourable conditions must not exceed 4 per cent. at a distance of 4,000 paces. The result of the competition will be announced by the 14th April, 1914.

(10) MACHINE GUNS.

INFANTRY MACHINE GUN DETACHMENTS.—The machine gun detachment of each infantry regiment is subdivided into four sections, each containing two guns. The training of the detachment is entrusted to a staff-captain or lieutenant under the general supervision of a lieutenant-colonel or captain. Junior officers must have completed at least three years' service before

appointment to serve with the detachment. A regiment must have at all times in its ranks a sufficient number of instructed officers and men to complete the detachment to war strength, without having recourse to reservists. Each detachment will contain three N.C.O.'s of extended service. Each year in the autumn, *i.e.*, when they have about nine months' service, selected men from the last batch of recruits are put through a preliminary course in machine gun work. The number of these men will be three per company in four-battalion regiments, and six per company in two-battalion regiments, *i.e.*, 48 men per regiment in both cases. From the number so trained sufficient men are transferred to the detachment to fill the vacancies in its peace establishment caused by the annual transfers to the reserve. The remainder rejoin their companies, but are from time to time seconded to the machine gun detachment for refresher courses. When this system is in full working order, *i.e.*, by the beginning of 1914, each infantry regiment should have upwards of 150 rank and file trained to the use of the machine gun.

The detachment occupies separate quarters, and each regiment has a miniature machine gun range. The horses of the detachment must be looked after by the men themselves, and are not permitted to be used for general regimental work.

MACHINE GUN INSTRUCTIONAL CAMPS.—Rules have been issued for the conduct of machine gun practice camps, which will be held annually in each district. The duration of the camps will be 15 days. If possible there will be a separate camp for the detachments of each division, but if sufficient ground is not available, those of an army corps or even of a district may be assembled in one camp. Cavalry detachments may be trained with the infantry detachments or separately in special camps. Each camp will be under a commandant of general or colonel's rank, who will be assisted by one to two General Staff officers, according to the number of detachments under instruction, and by an officer as technical instructor. One to four battalions will be detailed to assist in tactical exercises.

The programme of work must be drawn up beforehand. The time might be allotted, for example, as follows :—

	Days.
Inspection of guns and equipment and preliminary test of the training of the personnel	2
Field firing by each detachment at full strength	4
Demonstration of various methods of fire	2
Field firing at war strength	1
Field firing as part of a tactical exercise in conjunction with infantry	2
Firing competition	1
Pitching camp and holidays	3
Total	15

(11) HORSES AND VETERINARY SERVICES.

FARRIERS.—Regulations have been issued regarding the formation of regimental farriers' schools in the cavalry and artillery. Two men will be selected annually from the last year's contingent of recruits in each squadron and battery. Upon the conclusion of manœuvres, *i.e.*, when they have about nine months' service, they will be struck off all other duties for a ten months' course in farriery under the veterinary officer of the unit. At the end of the course, they will be examined by a board consisting of the veterinary officer of the unit, a squadron or battery commander, and, if possible, another veterinary officer. If their knowledge of the subject is considered satisfactory, they are granted veterinary certificates. The District Veterinary Officer may arrange for the instruction in these courses of men of other arms.

PRICE OF REMOUNTS.—The scale of prices laid down for the purchase of remounts is graduated according to the breeding, height, quality and place of purchase of the horse. Horses of over 15 hands 1.25 inches, purchased in the cultivated districts of European Russia, are obtained at prices varying from £26 6s. to £52 12s. Those of the same height obtained from the Don breeders cost £15 15s. to £26 6s. Unbroken Steppe horses of all heights realize £15 15s. to £17 18s.

(12) EDUCATION.

PROGRAMME OF INSTRUCTION IN CADET CORPS.—As a sequel to the reform of the system of instruction in the military schools, which was inaugurated in 1910, new tables of work have been issued for the cadet corps, in which most of the future officers receive their preliminary general education, before joining the military schools. The number of weekly lessons will vary from 28 to 30, according to the class. The 30 lessons in the seventh or final class, are allotted to Divinity (2), Russian (4), Modern Languages (5), Mathematics (6), Physics (3), Cosmography (2), Geography (2), History (4), Law (2). The classics are not studied. The instruction is on general lines, but two works on military geography are suggested among a large number of others, as likely to be of assistance to instructors.

STUDY OF FOREIGN LANGUAGES IN CADET CORPS.—Instruction in foreign languages in cadet corps will be in future confined to translation, and an attempt to attain a correct pronunciation through practice in reading aloud. It is recognized that practice in conversation is impossible in the few hours devoted to the subject. All boys will be required to possess a certain knowledge of French on entering the corps. In the First Class the study of a second language—German or English—will be commenced. Both French and German (or English) will be studied in the First, Second, Third, Fourth and Fifth

Classes, *i.e.*, for five years. During the last two years in the cadet corps, in the Sixth and Seventh Classes, cadets will specialise in one of the two languages, discontinuing to work at the other.

ORIENTAL LANGUAGES.—Schools for the instruction of officers in oriental languages under the supervision of the district staff have been formed in the Caucasus, Turkestan and Pri-Amur Military Districts. The courses will commence on the 1st October each year, and will last eight months. No officer above the rank of lieutenant will be admitted. The classes will consist of five officers in the Caucasus, five in the Turkestan and 12 in the Pri-Amur Military District. On the conclusion of the preliminary course, officers will be despatched on language leave. From the Caucasus and Turkestan Military Districts all graduates of the preparatory class will be detached for one year to places in the district "with a dense native population," and in the following year, four will be sent from the Caucasus to Turkey and one to Persia, while four from Turkestan will go to Persia and one to Kashgar or Ili. From the Pri-Amur Military District, six officers will be sent for two years to China, four to Japan, one to Korea and one to Mongolia. Officers will be examined at the end of their first and second year's language leave. Those classed as "excellent" will receive a reward of £34 at the end of the first year, and of £66 at the end of the second. All officers classed as "good" in the second year's examination will be styled "military interpreters," and will, while serving in the particular military district, receive extra pay at the rate of £66 a year till they are promoted to the rank of captain. Military interpreters are obliged to serve in their special military district a minimum of at least three years from the date of the final examination. They will be subjected to triennial tests by examination for ten years.

ADMISSION OF N.C.O.'S TO MILITARY SCHOOLS.—It has been laid down that acting ensigns serving with the colours and sub-ensigns may, if unmarried and not over 28 years of age, be admitted to the three-class military schools to qualify as officers. The three-class military schools are those which were converted from *yunker* schools in 1909 and 1910, and which still retain a modified general education in their curriculum.

IMPERIAL NICHOLAS MILITARY ACADEMY.—The establishment of the Russian Staff College includes:—One commandant of the rank of lieut.-general, one director, and ten officers superintending instruction (all field officers of the General Staff), 20 professors (officers up to the rank of major-general, or civilians), six instructors in military subjects (officers of the General Staff), and two officer instructors in sketching. Of the 20 professors, 13 instruct in various military subjects, two in military statistics, two in military administration and 3 in

astronomy and surveying. There are 300 ordinary students and 14 in the survey section.

(13) COMMUNICATIONS.

NEW RAILWAYS.—The following lines have been opened for general traffic :—

North Donets Line : the whole line from Rodakovo to Lgov. Bataisk-Azov Line. Armavir-Tuapse Line : Section Armavir-Maikop. Lieska-Nurmes Line (Finland). Vladikavkaz Line : Branch Kavkazkaya-Yekaterinodar. Oranienbaum-Krasnaya Gorka Line. Volgo-Bugulma Railway : Section Melekes-Bugulma. In Western Poland the lines forming the system of the Warsaw-Vienna Railway Company have been acquired by the Government by compulsory purchase. The Gerbi-Kyeltsi Line has been converted from narrow to broad gauge; and the Kyeltsi-Chenstokhov Railway has been opened for traffic.

The following have been opened for temporary passenger and goods traffic :—Chelyabinsk-Troitsk Line. Kokand-Namagan Railway : Kokand-Right bank of Sir Daria Line (27 miles). Volmarski Narrow Gauge Line : Section Volmar-Smilten (20 miles). Saldinsk-Alapaev Line (Perm). Tyumen-Ishim Line. The Head (extreme western) section of the Amur Railway, 120 miles in length.

AMU DARIA FLOTILLA.—The Amu Daria Flotilla has been placed under the Commander of Military Communications in the Turkestan Military District.

(14) MISCELLANEOUS.

MILITARY LITERATURE PUBLISHED IN 1911.—The following new training manuals have been issued :—

Instructions for the Training of the Cavalry Remount (to replace the provisional edition of 1902).

Instructions in Gymnastics (to replace Instructions in Field Gymnastics, 1880).

Instructions in Military Engineering for Officers of all arms. Provisional. (To be reported on by senior military commanders by the 1st July, 1913.)

Field Service Instructions for Medical Officers.

Regulations for the Training of Cossacks in Instructional Gatherings. (To replace Regulations for the Instruction of Cossacks assembled in Instructional Camps, 1910.)

THE RIFLE: A WEAPON OF PRECISION.

By CAPTAIN J. H. HARDCASTLE, *p.a.c.* (late) Royal Artillery.

In the introduction to his new volume of l'Encyclopédie Scientifique, "l'Artillerie dans la Bataille," Colonel Paloque uses a peculiarly expressive phrase to describe his preceding volume "Artillerie de Campagne," dealing essentially with material. He says "*Ayant déjà considéré le canon indépendamment du temps et de l'éspace il importait d'étudier l'organisme complet dans le milieu où seront provoquées ses manifestations actives c'est à dire, dans la bataille.*"

As beseems a gunner who has specialized in small arms but has never been on active service, I propose to confine my remarks to the rifle "*indépendamment du temps et de l'éspace*" and also to treat of it only so far as the wording of the title prescribes. At a reasonable computation there have been in the immediate past more than a hundred different guns in use by the artillery, from the 100-ton muzzle loader to the Morris tube. Their projectiles vary from a ton to a fraction of an ounce; their charges from hundredweights to grains; their velocities from 3,000 to 300 feet per second, and their internal pressures from 20 tons per square inch to an unconsidered trifle. In consequence, the artillery officer has to make himself acquainted with the fundamental principles of gunnery as an exact science, and even to evolve those principles where they are still obscure, and to amplify them continuously, so as to be ready for the increasing complexity of the new problems which arise as the demands of the world become more and more exacting. In this way the science of ballistics, both exterior and internal, has grown up, beginning as a collection of trade secrets known only to the fireworkers, but now demanding for its further development the services of the greatest masters of natural philosophy, even proffering to the ingenuity of its students questions which so far have baffled the acutest intellects. From the character of the subject it is best studied on a large scale so that, by the ordinary laws of nature, gunners who have a great variety of weapons to deal with have the greatest incentive to possess themselves of a sound and sufficient knowledge of ballistics, and its handmaid, range finding.

It is but a step to combine these sciences with the arts of aiming and observation of fire, and so to construct an elaborate and efficient system of fire-discipline in which each man has his particular duties to perform as part of a vast and complicated machine, so thoughtfully adjusted that no one casualty can affect the continuity of action of the whole.

The working of this natural law is apparent in the history of our own times, and besides its proper fruits, it has produced somewhat of a calamity. The birthplace of the science of ballistics was in the workshops and arsenals, and its foster-mother

naturally came from the ordnance departments, so that for all that concerns their own particular weapon, its design and manufacture, the infantry have had to rely to a great extent upon the assistance and technical knowledge of officers of a different branch of the service. By their education and training gunners cannot be intimately acquainted with the particular qualities desirable in a handgun, and from want of personal experience in its use, they must frequently fail to appreciate many important points, or to seize upon new ideas early enough to be not merely up-to-date, but in the actual forefront of progress. Yet by virtue of their fostering care of the science in its younger days, they have obtained an almost prescriptive right to the first refusal of all the best education, and of the subordinate and even paramount positions connected with weapons of war. In this way the actual users of the rifle are deprived both of knowledge and of means of acquiring knowledge except by unusual or extraordinary perseverance. The great majority can have but little theoretical knowledge of their weapon, and even those who have mastered every detail have had to take their education largely from my branch of the service from want of other sources to which to apply. This, then, must be my excuse for venturing to speak to riflemen at all, and especially for appearing to pose as an expert on their own weapon.

RIFLING.

The history and origin of rifling is generally said to be obscure or unknown, or at any rate, to date from the early part of the sixteenth century. But such statements emanate from librarians and keepers of museums, and other such guardians of the débris from the progress of the living thought. The benefit of spin was known to the first archers and to the first jugglers. They found that they could forecast the path of a moving body better if it had a rotary motion. Very soon after gunpowder was invented it was used as a propellant, although, thanks to the forgeries of Delbecq in the early part of last century, the exact date is uncertain. The antiquaries' account refers to the making of the grooves and not to the object to be obtained by their employment. The argument certainly employed by the first groove cutter was that arrows hit at a greater distance when they were spun, so that spin should improve the flight of a ball. As the easiest way to spin a round shot was by grooves in a barrel, grooves were cut, and at once it was found that the accurate range was increased. Then the theorist awoke and put forward suggestions to account for the improvement in shooting, and until the middle of the eighteenth century the wildest notions prevailed. That they are not yet altogether extinct may be seen by consulting the new edition of the *Encyclopedia Britannica*, where the learned author of the article "Rifles" states solemnly that the "Rotatory motion—in a measure overcomes atmospheric resistance." It was in 1746 that Benjamin Robins demonstrated that the sole excellence of the practice of rifling lay not in the spinning of the

ball, but in this, that it gave a spin to the ball on a predetermined axis, and so caused the drift to be always the same in direction. He found that no ball could be discharged from a smooth bore without rubbing against its sides, and thus acquiring a whirling motion as well as a progressive one, and that it was impossible to predict the position of the axis round which the ball would whirl, or the consequent direction of the incurvation of its track. He says that he himself saw a bullet in a range of 700 yards deviate above 100 yards from its direction in consequence of this whirling motion. He relates that he purposely bent a smooth bore barrel to the left three or four inches from its muzzle, and predicted that the bullet itself might be expected to incurvate towards the right, and this upon trial did most remarkably happen. Practical gun makers are still trying to get a satisfactory design for a combined ball and shot gun, but so far they have not tried a barrel bent slightly downwards. The bend would have very little effect on the pattern of the shot charge, and would increase the accuracy of the ball by giving it a known incurvation, and that against gravity.

For nearly a hundred years until about the beginning of Queen Victoria's reign little or no use was made of Robins' discovery of the real use of rifling, beyond the raising and arming of the Rifle Brigade. What progress was made chiefly concerned the accuracy of workmanship in sporting weapons firing spherical bullets. Robins also said that an egg-shaped bullet could be fired accurately from a rifle if loaded with its broad end forward, so that its centre of gravity, lying nearer to its forepart than its hinder part, its longer axis would be continually forced by the resistance of the air into the line of its flight. A ball fired from a rifle can only bear in the grooves over a very small area, so that but little spin can be imparted without the danger of stripping, and owing to its symmetrical shape the spinning axis remains always parallel to the line of sight, instead of to the line of flight, and so produces an incurvation increasing rapidly as the curvature of the trajectory, due to gravity, increases. For these two reasons elongated bullets were tried by many experimenters, though with but little success, partly because of the difficulty of obtaining the necessary expansion into the deep grooves of existing muzzle loaders, partly from ignorance of the amount of spin necessary to ensure stability in flight, but chiefly owing to the entire absence of any sure foundation of knowledge.

At the time of the Crimean War the Minié rifle was the best in military use, although it was considered by Major John Jacob to be "A disgrace to the intelligence of the age, and an outrage on common sense." This officer had, at his own expense, in 1846, produced a 24-bore rifle firing a lead bullet pointed with zinc, weighing a little over an ounce, with a velocity of 1,700 feet per second, and capable of accurate practice at 2,000 yards. This weapon was far superior in fire effect

to the Snider, and was even comparable to the Martini Henry, but it was rejected by the Government of India, and together with all Jacob's work seems to have been completely forgotten, and to have left no trace behind it except an entry in the catalogue of the British Museum Library.

About the same time Metford turned his engineering abilities into the small arms direction, and Whitworth was commissioned by the Government to make an elaborate series of experiments to produce a better rifle. Their work was of the utmost value, but dealt almost entirely with manufacturing principles and details, and only incidentally with the fundamental laws. Their chief object was to produce a particular effect, that is to say, a better gun rather than to investigate the nature of the quality goodness as applied to guns in general. It was their special work to produce a weapon of sufficiently accurate structure and performance to fulfil the actual requirements of everyday life as known to their contemporaries. It was too soon to enquire into the limits of possibilities. Neither Bashforth nor Noble, who are both still alive,[1] had begun their investigations into the resistance of the air and the force of fired gunpowder. Accuracy of machine work in metals was still waiting for Whitworth's true surface, and the genius of the United States for labour-saving devices.

In 1864 Bashforth was appointed to a professorship at Woolwich, and at once began his historic work to determine the resistance of the air to a projectile, and the first round was fired on November 23rd, 1865. By the year 1875 ballistic tables of the form which we now use were in print and could be bought. In 1880 Bashforth's final report was published for velocities from 100 to 2,800 feet per second, and it became possible to calculate the particulars of the flight of a bullet. In 1879 his successor, Professor Greenhill, found that the sharp spin of one turn in 12 calibres usual in howitzers set up such heavy torsional strains between the liner and the jacket, that the gun wrung its own neck, and shearing the copper vent automatically spiked itself. Thereupon he set himself to investigate the whole question of the spin of rifling required to produce steady flight against the resistance of the air, which subject was then in a chaotic state. I have before me as I write an article from the American *Journal of Science and Arts*, dated July, 1860, by Ogden N. Rood, of Troy University, entitled "Experiments on the forms of elongated projectiles." He was, in his day, a great scientific authority on rifles, and his knowledge amounted at least to the general knowledge of the present day, that the longer the bullet the greater is the spin required, all else being unknown and apparently unknowable except by trial. Greenhill's mathematical investigation resulted in a simple table of the minimum spin

[1] Since writing these words the death of the Rev. Francis Bashforth, B.D., has occurred on the 13th February, 1912, in his ninety-fourth year. J.H.H.

required for stability. The angle of rifling is expressed as one turn in so many calibres, and the whole table can be found in almost any text book, except, curiously enough, the Text Book of Small Arms. For solid bullets of lead and tin alloy, with a specific gravity of 10.9, the length l of the bullet in calibres nearly varies inversely as the twist n of the rifling in calibres, so that the relation can be expressed to all practical purposes by saying that the length multiplied by the twist equals 150.[1]

For other specific gravities of the projectile, and of the medium which it traverses, n varies as the square root of the ratio of the densities, so that an aluminium bullet of one-fourth the density of lead requires twice the spin; or a lead bullet passing through water or animal tissue 900 times the density of air requires a thirty-fold spin to ensure stability, as remarked by the German Emperor in a discussion following a lecture on the subject by Professor Cranz. Hollow shell require a greater spin than solid or filled shell, according to the size of the cavity, but shell filled with water are always unstable unless the cavity is more than three calibres long. A slightly different spin is required for a difference in shape of the head, and balance of the bullet—as shown by its way of floating in a mercury bath—has an effect. The actual calibre of the bullet is not of any significance, as the spin necessary depends upon the length of the projectile, measured in calibres, not in inches. Changes in muzzle velocity also do not matter, because the number of turns per second varies directly as the muzzle velocity, and falls off after leaving the muzzle slower than the velocity of translation of the bullet, so as actually to produce a considerable overscrew at long ranges, and to increase the drift. In the steady motion of a shot, the centre describes a helix, of which the axial advance is the square of the length of the shot in calibres plus one, multiplied by the length of one turn of the rifling, which, in the case of the four calibre bullet of our service rifle with one turn in ten inches, is 170 inches, or nearly five yards, the diameter of the helix being a small decimal of an inch.

As Professor Greenhill's solution has been public property for over thirty years and has never been challenged in any essential, and has, moreover, been used by all makers, with or without acknowledgment, it may be taken as final.

EXTERIOR BALLISTICS AND THE RESISTANCE OF THE AIR.

Before Galileo made his experiment in 1590 by dropping weights from the leaning Tower of Pisa, the philosophy attributed to Aristotle explained that a trajectory consisted of three portions; a violent or straight motion to point-blank range, a natural or straight motion to fall to earth at the end, and a mixed or

[1] The formula $l\,n\,0{\cdot}88 = 99$ gives almost exact results. The real formula is long and complicated.—J.H.H

curved motion to turn the angle between the two straight portions. This explanation has a great deal to commend it for rifle fire over unknown ranges, as it divides the two-mile random of modern military rifles into its three distinctive divisions. The point-blank range corresponds to the individual fixed sight range depending on the power of the cartridge and the height of the objective, and is, in fact, the range due to a time of flight in seconds equal to half the square root of the height of the objective in feet. The natural period of motion corresponds to fire at over a mile range, which is comparatively useless, and the mixed motion to the period when individual fire is useless, but collective fire is effective. The first result of Galileo's work was the determination of the gravity acceleration as 32 feet per second, and the parabolic theory of a trajectory in a vacuum, which theorem, by the way, is only true if the earth is flat. On a spherical airless earth the trajectory is elliptical, although practically indistinguishable from a parabola. The next result was the birth of the idea that the air resisted a projectile, and in June, 1710, Newton, taking advantage of the rebuilding of St. Paul's Cathedral after the great fire, let fall glass globes filled respectively with mercury and with air. In their fall they described a height of 220 English feet. The mercury balls, of $\frac{3}{4}$ inch diameter, weighed about two ounces, and fell in four seconds, and the air balls, about five inches across, weighing about $1\frac{1}{2}$ ounces, fell in 8 seconds. His "Principia" was published in 1729, and the details of these experiments are to be found there. In Book II. Prop. XXXIII. he shows that the retardation of the air on a projectile varies as the square of the velocity and of the diameter, and inversely, as the density of the material to that of air. In the same book, Prop. X., he shows how to find the density of the medium in each place, which shall make the body move in a circular, parabolic, or hyperbolic trajectory, but he does not treat of the trajectory in a medium resisting in the duplicate ratio of the velocity. In 1718 John Bernoulli in response to Keill's challenge showed how to find the curve of the trajectory in a medium whose resistance varied as any power of the velocity, but his resulting expressions were of such mathematical complexity that they were practically useless, even if the law of resistance and the muzzle velocities were known.

Again we have to refer to Benjamin Robins for the beginnings of practical investigation. In Chapter I., Prop VIII., of his New Principles of Gunnery,[1] first printed in 1742, he shows

[1] Robins was an unsuccessful candidate for the post of professor of fortification at the Royal Military Academy, Woolwich, in 1741, John Muller, a Court favourite and preceptor to H.R.H. William, Duke of Gloucester, obtaining the preferment. In his "Appendix or Supplement to the Treatise of Artillery," London, 1768, Muller wrote: "Mr. Robins in his treatise on gunnery tried by a great many experiments to determine the force of powder, but finds the velocities in general much greater than

how to obtain the actual velocity of a bullet, and that by firing into a ballistic pendulum, the block of which necessarily recoils a distance directly proportional to the velocity. By increasing the distance of the gun from the pendulum, and observing the falling off of the striking velocity, exact figures are obtained, showing the effect of air resistance. He found that up to about the velocity at which sound is propagated through the air, the resistance varies according to Newton's law, but at greater velocities it shifts its resistance to nearly three times as great as it should be by a comparison with the smaller velocities. He then defines the terminal velocity as that at which the projectile must move so that its resistance may be equal to its gravity, this velocity being the greatest a body falling freely in air is capable of attaining. By utilizing this velocity he shows how to correct the range calculated by the parabolic theory to obtain the actual range in air.

Between the years 1775 and 1790 Hutton experimented at Woolwich Arsenal on the same lines, and in 1840 General Didion published the results of his experiments at Metz, both, of course, with round shot. The work of Didion must always be honoured, as it is to him that we owe the solution of the wind problem, of such importance in all aimed fire. Our own Musketry Regulations treats the subject in pessimistic fashion, beginning with the gratuitous mis-statement that a side wind acts on the greater surface of the bullet (as though the bullet's spin was not a rudder) and saying that no rules can be framed to guide the firer, and that the allowance for wind at long ranges is out of all proportion to that necessary at short ranges. Didion, however, laid down the most precise rules for cross winds, and Greenhill's writing in the *Memorial de l'Artillerie navale* (1909) completed Didion's work for head or following winds. The formulas are to be found at the end of the Text Book of Small Arms, 1909, together with my own formula (12), taken from the Journal of the United States Artillery, May, 1903.

For Mark VII. bullet, Greenhill's formula for a ten mile breeze is, in yards change of range, one-twentieth of the square of the hundreds of yards in the range, or five yards at a thousand and 20 yards at two thousand, both of which are negligible. My adaptation of Didion's formula for the same bullet says, multiply the wind speed by the hundreds of yards in the range and divide by six to get the minutes deflection, giving for the same wind and ranges 16 and 32 minutes respectively. This formula can easily be arrived at by imagining the rifle and target to be on separate trains moving through still air at the speed of the supposed wind, and in suitable directions. The correction for the speed of the target depends

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they possibly can be;.....whereas we prove that this velocity can never amount to 914.7 feet in a 42-pounder, and consequently much less in a smaller caliber."—J.H.H.

upon the time of flight and for the speed of the firing platform on the muzzle velocity of the bullet, and the two together give Didion's formula.

It was the institution of the Advanced Class of Royal Artillery Officers at Woolwich in 1864 which was the direct cause of the next and the most important step of all in our knowledge. As mentioned before, Bashforth was appointed professor of applied mathematics by Lord de Grey and Ripon, and began by investigating the subject which he was expected to teach. His work is our classic. He it was who got round Bernoulli's mathematical difficulties, and also gave us the first real experimental resistances offered by projectiles of all sorts of shapes at all possible velocities, together with simple tables for finding the time of flight and remaining velocities at all ranges. As soon as Bashforth's results were published, artillerists of every nation fastened upon them and began the work of simplifying the calculations necessary for long trajectories, and, as is well known now, the whole of any ordinary rifle trajectory can be calculated by Bashforth's tables of time, and space, and the Italian Major Siacci's double entry table converted into English units by Mr. A. G. Hadcock so recently as 1897. My own connection with this fascinating branch of study began with the new experiments initiated by the Ordnance Committee in 1902, when I had just joined the advanced class as a student. These new experiments were undertaken because velocities were being obtained greater than 2,800 f/s, the limit of Bashforth's experiments, and it became my duty to reduce the results of the firings at Shoeburyness, and so to obtain the new laws which are published at the beginning of the new tables. The shape of the projectile used as standard was slightly more pointed than Bashforth's, the head being struck with an ogive of two instead of one and a half calibres radius, and the limits of velocities were from 400 to 4,000 f/s, the latter extraordinary velocity being obtained with a calculated pressure of 22 tons in a three-inch gun by increasing the charge to four lbs. of cordite and reducing the weight of the shot to six lbs. During the work of reduction it became very evident that the law of resistance shifted in a remarkable way at the velocity of sound, and it often seemed to me while working in this region of velocity that variations in the velocity of sound were making themselves observed on the chronographic records and so disturbing the calculations. By a most remarkable coincidence Bashforth found a change in the law again at the velocity of 2,400 f/s, at which velocity air rushes into a vacuum, but I could hardly find a trace of any such change. On referring to Bashforth's original records I found that one set of rounds covered the velocities 2,800 to 2,400 f/s, and a separate set the velocities 2,400 to 2,000 f/s, and that the change of law was only apparent, and not real. Most important results were obtained by comparing all the resistances offered by various shapes of head used in all the

known experiments, and noting that the resistances given by one shape was no definite multiple at every velocity, of those given by another shape. It was extremely unfortunate that no connecting factor could or has yet been found, because the experiments terminated just when the new pointed bullet became known in England. As a result the sight scale for the Mark VII. bullet or for any modern pointed bullet can only be determined by actual and lengthy experiment, and all calculated elevations, velocities, and times of flight, and also the extreme range are but tentative. A strong suspicion that some such difficulty was liable to be encountered has existed for many years, as the result of the shooting of the old 0.461 match rifle with a Metford head somewhat similar to Mark VI. This bullet appeared to offer but three-quarters of its proper resistance to the air, as judged by its elevation at 1,000 yards, and it is to these apparent trivialities and discrepancies we must now look to improve our present bullets and rifles, because the new shape of bullet came from abroad and took us all by surprise, from our habitual want of systematic experiment.

ACCURACY OF FIRE AND RANGE FINDING.

The two men whose names must always be associated with accuracy of rifle fire in England have already been mentioned; Whitworth and Metford, and their work is complete. Both were civil engineers, and amongst the first to know the meaning of a ten-thousandth part of an inch. They were competitors in designing rifles, the former with the resources of the nation behind him for a time, the latter with but his modest pocket and his enthusiasm to draw upon. Whitworth's work has been written up fully, yet but little has been published of Metford. By Colonel Fremantle's kindness I have before me the abstracts of the first volume of Metford's notes, from 1851 to 1860, touching upon every possible cause of accuracy and the reverse. Let us hope that some day all the volumes will be incorporated in a printed book. The number of subjects on which he experimented is enormous, and their nature covers every detail. When he began the standard of "good club shooting" at 100 yards was so poor as an eight inch figure of merit, which figure is now commonly obtained at 500 yards, and invariably beaten by experts. It would occupy too much space to give even a list of his subjects. It must suffice to say that it was not until 1864 that breech loading was decided upon, and that he lived to see the Lee-Metford perfected as the service arm, and made under the superintendence of Mr. John Rigby, an almost contemporary experimenter with himself and Whitworth. Four of his most remarkable notes refer to the upsetting of a lead bullet into the grooves, the correction for drift by tilting the sights now universal in ordnance, the observation that a bullet in its flight behaves like Foucault's pendulum so that if at the instant of firing the plane of the trajectory passes through a particular

star near the horizon, it continues to pass through that star during its flight, and lastly, the existence of "flip" as a variable depending upon the load, though he erred in the exact explanation of this phenomenon. If there is any decline in numbers or interest in the men from whom the teams for the Elcho Shield are recruited it is because Metford's work has left no worlds to conquer. The modern small bore rifle is now accurate enough for target practice at three-quarters of a mile, and the problem now before us is not to develop its accuracy, but to utilize it.

Given a known range of less than a mile and the observation of but one sighting shot, an enemy is no longer safe from individual fire whilst he is visible to trained men. Yet experience shows that one per cent. of casualties per hour is a high average, because the range is not known and there is no sufficient observation of fire possible. Twenty-five years ago the coast artillery could not hit a moving ship at a mile range with any certainty, as there was hardly any true fire discipline and no range finding. The introduction of the Watkin and Barr and Stroud range-finder, has changed all that, and the perfecting of automatic sights has put even those instruments out of date on land. Quite recently a most eminent professor of the science of gunnery delivered a lecture to the Junior Institution of Engineers on a new principle of sighting invented by Sergeant Ommundsen, which on paper has much to commend it, as it extends the fixed sight range by a considerable percentage. Shooting at a standing man, aim is taken invariably at a point a man's height below his feet, which allowance may easily be judged with reasonable accuracy. The effect is to subtract automatically from the angle of elevation on the fixed sight, the range finding angle due to the height of the man at the range at which he actually is, so that although the angle of elevation of the sight itself is fixed, the real angle of elevation above the ground line on which the man actually stands becomes less as the range diminishes and the range finding angle increases. From this automatic subtraction of the range finding angle the new system derives its name Negative Angle Sighting. By a simple arrangement of the fixed sight itself the aperture can be lowered so as to give a trajectory suitable for a kneeling or prone enemy. Perhaps this addition, which is as applicable to ordinary aim as to negative aim, may be found to obviate the common objection to the system of fixed sights, that an enemy has only to kneel to be safe. The permanent angle on the negative sight is of course different from the usual fixed sight elevation. The latter is for a range at which the height of the trajectory is the height of the target, and the former is for the range at which the trajectory is double the height of the target and it appears from calculation that the extension of the danger zone by the negative angle system amounts to quite 15 per cent. for all military rifles. It is not known yet at all whether the ordinary soldier can be taught to aim off his objective by

the constant amount, but it is a demonstrable fact that, if he does so aim off, the danger zone is increased by this appreciable percentage, greater actually than the advantage of the Mark VII. over Mark VI. cartridge.

Whatever else Sir George Greenhill's lecture effects it must do good by drawing attention to the enormous number of cartridges which have to be made and transported to the scene of operations to produce one single casualty by rifle fire. It is a misnomer to call a military rifle in the hands of troops by the name which it could, but does not obtain in practice, a weapon of precision.

The work of the manufacturing departments is enormously increased and complicated by the existence of the possibilities of long range fire, and the difficulties confronting the author of the Musketry Regulations are rendered appalling by the mere insistence that rifles should be sighted and used beyond a mile. Beyond the distance at which a man can see the effect of his own shot, a rifle bullet may not improperly be said to have a danger area of two square yards horizontally, and a battlefield to have a population of so many thousands to the square mile distributed irregularly with but vague indications of the density in any particular area. At one place each man might have fifty square yards to himself and at another ten times as much, so that a thousand bullets fired at random should cause from four to forty casualities in the absence of bullet proof protection. Allowing for ninety per cent. of such protection, whether natural or artificial, these casualties are reduced so as to be fairly comparable to the actual service proportion of casualties to cartridges expended, and are far fewer than the results of field firing in manœuvres would seem to indicate. The section in the Musketry Regulations, entitled "The dispersion of individual and collective fire," may be condensed into one sentence defining the accuracy of expert and of ordinary marksmen. The average error of aim of an expert is about two inches for every hundred yards of range or two minutes of angle, and of an ordinary shot about four times as great. The total angle of opening of the whole cone of fire is then about thirty minutes, allowing for all the imperfections in rifles, sights, cartridges, and men on peace manœuvres, and this agrees fairly well with French estimates. Lieutenant L. Mondeil in his book "*De la résolution des problèmes de tir sur le champ de bataille*" discusses the use of this piece of information at some length in connection with Colonel Lafitte-Rouzet's dictum that it is necessary for the firing line to consist of one man per yard of the enemy's front, and to fire one round for every hundred yards of the range to produce twenty per cent. casualties at an erect enemy up to twelve hundred yards, and far more beyond that range. Mondeil points out that the size of the cone found by peace firing must be multiplied by some large and unknown factor to produce the size of the real battle cone and finishes with the truism that the only way to obtain a superiority of fire is to put into the firing line an efficiency greater than the enemy's. It

is this very efficiency that the manufacturing and musketry departments are now straining every power to obtain. The question of sufficient accuracy in the rifle itself has been solved and the limits of weight and strength are known.

The possibilities of personal error are only too well known, but the paralyzing effect of perfect fire discipline, producing well-directed and coolly aimed fire, has not been habitually exploited, and in consequence the problem of the best trajectory, that is to say the relative importance of individual fire at a definite man and of collective fire, cannot be attacked with any hope of success, because the deciding factor is the size of the real battle cone compared to the experimental thirty minutes cone.

The light German medium calibre pointed bullet, with its 2,900 f/s velocity, is generally said to have been adopted as a stop-gap pending further change to a smaller bore. Yet it constitutes a definite type, and deliberately sacrifices sectional density and depth in the beaten zone of collective fire at long range in order to extend the fixed sight range of individual fire as far as possible, and to retain the power of causing a severe flesh wound by its large diameter. This type can be but little further developed even in a specially designed rifle because of the recoil, and it stands in bold contradiction to such a weapon as the 0.280 Ross, often spoken of as the ideal military rifle, with its really moderate velocity of 2,700 f/s, and its mere 800 yards flat trajectory, but with its great ranging power and consequent bullseye accuracy in a high wind. It is a shrewd compromise, deliberately avoiding any extreme, and again limited in development by the recoil.

The true antithesis to the German type would be on the lines of the unsuccessful United States naval rifle of six mm., but properly designed to shoot straight and to take every advantage of its reduced calibre. The bullet would be of the knitting needle type, weighing 120 grains, and perhaps six calibres long, with one turn of rifling in six inches. The cartridge case would be as big as the 0.280 Ross, and the velocity well over 3,300 f/s, the bullet relying on its high sectional density and enormous velocity to obtain a fixed sight range of a thousand yards, with great striking energy, momentum and shield penetration, at the supposed cost of lack of stopping power. The new 0.220 Hi-Velocity Savage goes a long way on these new lines as a light sporting rifle having a 70 grain bullet of 2,750 f/s and a most unusual shape of cartridge. It will be seen then that there is a great margin for choice in our new rifle, and that the final decision carries with it a great responsibility. With our national genius for compromise in all matters not purely naval, a modified 0,280 Ross would seem to be indicated as our next weapon. The merits of a really small bore seem to be in danger of neglect because of its novelty, leaving us to follow timidly in the rear of foreign progress.

THE TIDAL WAVE AND CURRENT.

By COMMANDER J. F. RUTHVEN, Commodore of the Orient Line.

CURRENT as usually defined is not an attribute, or in any measure a product of wave motion. In the now generally accepted trochoidal theory of deep sea waves the particles move with uniform velocity in circular orbits, whose planes are normal to the wave crest. The diameter for surface particles is equal to the height of the wave, and for those below the surface the diameter of the orbit diminishes in geometrical progression as the depth increases in arithmetical progression, or very rapidly. Each particle completes a revolution during the wave period (*i.e.*, whilst a crest covers the distance between itself and the one in advance of it), and, neglecting its vertical movement, a surface particle travels forward a distance equal to the height of the wave and back over the same space, whilst the wave form is advancing its own length. There is thus no movement of progression for any individual particle, as may be proved by the case of a vessel (or log of wood) in a swell during a calm, when she just rises and falls as the crests pass under her. This theory, originally evolved for each of a series of waves on the surface of a perfect fluid with unlimited depth and expanse, is sufficiently exact for our oceans until the water begins to shoal. When the depth becomes reduced to about half the wave length vertical compression commences to operate appreciably upon the orbits, which then elongate into ellipses. The ellipticity increases as the depths decrease, the period and time of revolution undergoing no change; but the wave gets shorter and steeper by bottom friction, and its velocity is evidently less because it covers its shorter wave length in the same interval of time. It is clear that *circular* orbits of, say, four feet diameter could not exist in three feet of water, and so accommodating Nature, to save them from destruction, alters their shape. Bottom particles, having no room for orbits, move backwards and forwards in a horizontal straight line. It seems, however, certain that in many cases, especially where there is a very gradually sloping beach, the waves of a series change into what is known as a "solitary" wave or "wave of translation." In this case there is a permanent lateral movement of the particles, but it is small, and in a canal or channel easily calculated by a well established formula. Scott Russell's experiments showed clearly that the volume of particles first set in motion took the places of those they displaced and *remained there*. The volume ejected in turn displaced those on the other side, and so on, and the wave form was thus propagated by a *very small* movement of each particle along an elliptical path in a vertical plane. Except when obstructed, the same particles that formed a vertical column before the wave passed, did so in their new positions after its passage. Scott Russell looked on the tide wave as

the principal example of the solitary species, although in his description of it he refers chiefly to its formation and behaviour in canals and narrow waters, and at the bow of a moving vessel, where he calls it the "wave of resistance." In this he has not been followed by later writers, such as Froude and Rankine, and in Scott Russell's day tidal knowledge had made little advance since Laplace launched the dynamical theory. He gave the length of the wave as 6.28 times the depth of water. Assuming the average depth of the ocean to be three and a half miles, this would give a wave length of 22 miles. The length of the tidal wave is 570 times greater than this.

Supposing, for simplicity, that the moon remains over the equator, and at a constant distance, let us see what lateral transference there would be for the surface particles of the tidal wave, assuming it to be trochoidal. The greatest length for an ocean wave is, as far as I am aware, about 50 times its height. The lunar tidal wave is 12,500 miles long, and has a height of only five feet, so that its length is about fifteen million times the height in the case of the moon, and over thirty million heights for the solar tide wave. It is conceivable that this may make a considerable difference in its behaviour, or even indicate a totally different class of phenomenon. In an ordinary deep-sea wave of this height the surface particles would revolve in circular orbits of five feet diameter, whose planes would be normal to the meridian. They would complete an orbit of about 16 feet in 12½ hours, advancing during half this time five feet and retiring the same distance in the latter six and a quarter hours. Their average horizontal velocity would be 9.6 *inches per hour, or* .0027 *inches per second*. But, owing to its great relative length to depth as well as height, it seems to be treated by the orthodox experts like a deep-sea wave approaching the shore, where the orbits become elliptical. Personally, I believe that it is *actual proximity* to the bed of the ocean, or what a seaman calls "smelling the bottom," which is absent in the case of the ideal world and in our deep oceans, rather than *relative* depth that causes the ellipticity in the orbits of waves on a beach. But supposing that the orbits of surface particles are lengthened to 38 times their height (which is surely extreme ellipticity) we would still have only a horizontal movement of 1/10 of an inch per second, the insignificance of which is at once seen when we remember that a slight current of half a knot is 100 times greater. Moreover, there would be no progression, the particles advancing on the upper slopes and retiring in the hollows, and such alternate motion as there is would be along the equator or parallel to it. If, now, we introduce the movement of the moon in declination, the sole difference will be that the orbits will diverge at a very small angle from the equator, like the thread of a screw with very fine and continuously decreasing pitch.

Where, then, are the currents that the best dynamical writers have told us bring water from great distances, not only along a parallel, but from the North and from the South simultaneously,

which would create vortices like the maelström even on the ideal world of Laplace, and yet are not to be found in any of our oceans? Neither of these waves would account for them, and I have seen no attempt to explain them other than as an essential condition or attribute of the tidal wave, which Stokes tells us "is nothing more (as far as regards the law of its propagation) than a very long wave of which the form may be arbitrary."

I submit and will endeavour to show reason why the tidal wave belongs to neither category, and that being generated under totally different conditions and by quite different forces must be governed by very different laws. The solitary wave differs from the trochoidal wave of the ocean, whilst this latter changes its nature as the water shoals, and sometimes takes the solitary form, and perhaps others, before breaking up into foam. Then there are capillary waves or surface ripples, which disappear almost immediately the wind drops, and which obey a code of their own unlike that for either of the two principal species. Now the tidal wave differs from all three more than they do amongst themselves. I have already shown that in relative length to height there is no comparison or similitude whatever, and this fact alone might, and probably does, change the whole problem.

To take an analogous case from an allied subject, the resistance of ships. At moderate speeds this generally varies as the square of the velocity, but when the vessel begins to create waves of any size the power of the speed by which resistance increases goes up by leaps and bounds, and, till comparatively recent years, it was supposed that this law would obtain for all possible increases in velocity. So much was this the case that the results of the trials of the first torpedo boats were received with grave doubt, if not incredulity. It was not till they were confirmed by further trials that it was found that when a certain speed was passed the law of resistance changed and the power of the speed expressing its variation began to diminish.

But the supreme reason why the tidal wave differs from all others is that they are caused by local forces and differences of pressure, whilst the former is the product of astronomical forces. The *difference* between the moon's attraction on the crest and hollow of the largest ocean wave is as nearly infinitesimal as anything we can conceive, and any possible integration equally so. The difference between the moon's attraction at two places situated on the equator and 90 degrees apart is not great, and is, in fact, so small that most tidal experts neglect the normal component of tidal force; but the tangential component of this force multiplied by the number of particles in a length of 6,000 miles becomes very appreciable. If the earth and the moon were simply revolving and keeping the same faces towards one another the tidal cones would form two permanent protuberances, whose presence would only be known by inference, or

deduction, or by very accurate measurement. Thus the cones without rotation would be but change of shape or deformation of the spheroid. In effecting this deformation there would be no revolution of particles either on the land or in the ocean. In syzygy and quadrature the movement of particles would be wholly vertical, and principally so throughout the quadrant. The particles would find their way to the new positions by the shortest paths. Rotation produces the wave not by altering the position of the cones, but by turning the different meridians through them in succession; and the particles in each meridian are either slowly rising, or falling, according to whether it is approaching or receding from one of the cones. Such is, I think, evidently the procedure in the case of the earth tides predicted by Lord Kelvin and measured by Professor Hecker, and the tidal wave of the ocean, being produced by the same forces, would, even though a fluid, obey the same laws. I can imagine no resemblance between such a wave and one produced by wind, earthquake, or other local disturbance, unless it is of the same superficial or illusory nature, as that which at first sight gives the impression that the water itself as well as the wave form is progressing when watching the swell of the ocean. The casual observer would tell you that wave motion and water motion are alike. The man who has studied the question knows that they are radically different.

I hope I have made it clear to the reader that even if the tidal wave was dynamical it could produce nothing worthy of the name of current, but only an infinitesimal oscillatory movement in the particles due to their orbital motion and equally clear (in previous articles and in Moxly's *Tides*) that the rise and fall are simply the effect of Nature maintaining hydrostatic equilibrium by differential squeeze as rotation alters the relative direction of the moon—the same static equilibrium as that most practical of modern scientists, the late Lord Kelvin, alludes to over and over again in speaking of earth tides, elastic tides, and the rigidity of the earth.

Thus on an ideal tidal world completely enveloped in a deep coating of water, no currents would be produced by the tide generating forces. Hence we must seek the genesis of those associated with the tides on our actual world in another direction. I have shown elsewhere that they are caused by obstructing continents raising the surface level, and the retardation due to friction of the bottom in shallow water.

THE VALUE OF TERRITORIAL FIELD ARTILLERY.

By Col. E. A. Lambart (late Royal Artillery).

THE question whether it is possible to make useful Field Artillery out of officers and men serving on a voluntary basis, under the conditions of training of the present Territorial Force, is one of some interest at the present time.

The nation is getting more than a little anxious about the present and future value of its last bulwark against compulsory training for home defence. The value of the Territorial Field Artillery is a most important point since an Army must have artillery, and the country is not likely to accept the enormous expense of providing its Home Defence Army with a sufficient equipment of regular batteries. This article is an attempt to answer the question from a limited point of view only, since the writer's experience is entirely confined to the brigades of the 2nd London Division, and it is certain that most of the conditions affecting efficiency vary widely in different localities. It is probable, on the other hand, that local advantages and disadvantages balance each other fairly equally all round, but it is better to confine oneself to one's own experience.

The writer has no hesitation in answering the question in the first paragraph in the affirmative. In his opinion it is quite possible under existing conditions of service to obtain brigades of Territorial Field Artillery which are worth their expense to the nation as part of the forces maintained for the defence of these islands.

Unfortunately it is necessary to add the qualification of a large "if."

What is included in that "if" will appear later. It is probably not understood by a great many people that on the conversion of the previously existing Auxiliary Forces into the Territorial Force, the provision of Field Artillery had to be made absolutely *ab initio*. The Yeomanry and Volunteer Infantry merely changed their titles and conditions of service, not their duties. But there was practically no Volunteer Field Artillery to convert, except the two very efficient horse batteries of the Honourable Artillery Company and a few batteries of position artillery, some of which occasionally masqueraded as field batteries under the cold shade of official discouragement.

There was a very large force of Volunteer Garrison Artillery, fairly efficient no doubt in its own line. But field artillery is as different from garrison artillery as chalk from cheese. For reasons which seemed good to the War Office it was decided to convert as many volunteer garrison artillery

units as were required into brigades of field artillery—a comparatively easy task on paper—but there is no doubt that this decision has very much delayed the development of this branch of the Territorial Force.

It is not necessary to be a soldier to understand that officers and men who, during the best years of their military age, have served their country to the best of their ability on their feet behind immobile guns in fortresses, are not easily trained in the care and management of horses, or likely to make efficient soldiers in active field work. The courage and goodwill with which the task of converting themselves was undertaken by the majority was beyond all praise.

Moreover the unfortunate garrison artillery man soon found that the military knowledge he had acquired at great personal sacrifice was, with the exception of his knowledge of the principles of gunnery, practically useless in his new rôle. He had everything to learn over again, even the words of command, which had hitherto successfully manœuvred him on a church parade!

Under the circumstances it soon became apparent to the regular officers entrusted with the task of organizing and training the new brigades that the first thing necessary was to get rid, by the gentlest possible means of a large number of the older officers and non-commissioned officers. The timely issue of a well-earned decoration greatly assisted the process.

Political considerations also hampered the progress of the new arm in the London Divisions in the first two years of its existence by insisting on a kind of annual training in camp, for which the brigades were by no means ready.

The writer retains nightmare recollections of the camp at Lydd in 1908, three months after the formation of the Territorial Force. Six brigades, fairly strong and enthusiastic, but with hopelessly ignorant officers and men, with an equipment of two guns per brigade, new and unfitted harness, and a job collection of 400 of the worst horses in the Kingdom, were sent to carry out training and practice in 12 working days in that desolate spot. With the exception of the permanent staff and one ex-regular officer, no one had the vaguest idea of his duties, or experience in performing them. Some of the embryo field gunners seemed to regard the ammunition rather in the light of interesting souvenirs for the parlour mantelpiece than as dangerous war material, and nothing but the special providence which seems to watch over earnest efforts at well-doing prevented the occurrence of "regrettable incidents."

The following year the artillery of the London Divisions were asked to carry out gun practice at Okehampton in the course of their divisional training on Salisbury Plain. This entailed, in conjunction with the moves to and from London, four comfortless nights in the train for each battery, and rendered impossible any system of progressive work. Again

Providence intervened and saved the situation by granting a fortnight of superb summer weather, but there is no doubt the military spirit of the Brigades was strained nearly to breaking point.

Seemingly interminable delays in providing suitable headquarters and equipment, the inevitable haggling over pecuniary details between the military and civil branches of the War Office, all these hindrances to progress, were experienced to the full by the Territorial Artillery in the first year of its existence, and nothing but the firm determination of the present War Minister that his scheme should have fair play could have overcome them. Happily a sense of this reliable support soon spread to the Territorial commanding officers, and served to counteract their natural discouragement.

On the brighter side is to be recorded the hearty and untiring assistance rendered to their Territorial brethren by all ranks of the Regular Horse and Field Artillery almost without exception. And it is no exaggeration to say that without such assistance the training of the Territorial brigades in the first two years would have been impossible.

PRESENT CONDITIONS AFFECTING EFFICIENCY.

It now behoves the writer to justify his opinion that it is possible to obtain useful field artillery under existing conditions of *service* in the Territorial Force (existing conditions of *training* raise quite another question), and for this purpose it is necessary to give some definition of what useful field artillery is held to mean.

Briefly it is this—for service in this country under the generally accepted limitations of an invading force in numbers and composition, the batteries must be able to get where they are wanted rapidly and without confusion, and to bring an effective fire to bear when they get into action.

This is admittedly a very rough definition, and many officers no doubt would wish to include other qualifications such as a sound knowledge of artillery and combined tactics, steady discipline under all circumstances, and good horsemanship. These, which cannot truthfully be said to have been yet attained, are not necessarily unattainable.

But, accepting for the moment the above definition of usefulness, let us see to what extent the artillery brigades of the 2nd London Division comply with it.

The London area affords peculiar facilities for instruction in equitation owing to the large number of civilian riding schools amply supplied with riding horses (these are now supplemented by two fine riding schools erected at Brigade Headquarters). Wimbledon Common and Wormwood Scrubbs meet all

requirements for driving and battery drills—but there is no available ground within reach where what is understood by the tactical manœuvres of artillery can be practised.

There is no difficulty in hiring suitable draught horses, and the present allowance for horse hire, apart from camp training, is sufficient if economically expended. Riding and mounted drills are popular with N.C.O.'s and men. The results obtained under these circumstances are exactly those that might have been anticipated. The riding and driving of three quarters of the personnel concerned is quite good. Tactical manœuvres of batteries are generally bad, and among the Territorial Officers, with few exceptions, there is no practical knowledge of combined tactics. This is due to no inability to learn or want of zeal, but to the fact that since the Force came into existence, no opportunity has offered of giving instruction.

The few days manœuvre in Kent in 1910, the scheme of which was completely upset by unforeseen circumstances, only served to test the marching powers and interior economy of the division. Finally as regards the important question of gunnery, the batteries at present do not, in the writer's opinion, fulfil the conditions laid down in the above rough definition of useful field artillery.

It would be a miracle if they did.

In the four years of their existence these batteries have had, up to the time of writing (April, 1912) exactly two days' regular practice on land ranges, and for two and a half years have had none at all. Some batteries have made voluntary excursions to Shoeburyness in the intervening summers and have fired a few rounds hurriedly over the sands there, but these excursions have served no useful purpose beyond giving to the men who attended them some experience in handling ammunition.

The batteries cannot at present shoot effectively, but this must not be taken to imply that officers and men have no knowledge of gunnery. The standard of theoretical knowledge is distinctly good, and the fire discipline, as far as it can be tested on the drill ground, is good and steady. Guns are correctly laid, and fuses are correctly set. Officers as a rule know the ranging drill well, and this is the more creditable, for a more complicated and confusing drill book to put into the hands of non-professional soldiers than the late Field Artillery Training, cannot be conceived.

HOW TO RAISE STANDARD OF UTILITY.

The above is a fair summary, in the opinion of the writer, given for what it is worth, of the professional efficiency of the field artillery brigades he has had under his command for the last four years.

In the remainder of this article it is proposed to consider the possibility and the best means of bringing them in all respects up to the standard of utility laid down.

How can the batteries be taught to shoot sufficiently well? and how can the officers learn enough of combined tactics to enable them to handle their batteries efficiently in the field?

The conditions of service cannot be altered, or at least they are not likely to be. We can only reckon on a maximum of 15 days' field training even if the 18 days' camp for which mounted units can be kept out, is insisted on, which has never been done yet. Into these 15 days have to be compressed all the tactical training with other arms and the gun practice of the year if ranges are available. In the writer's opinion it would be a great mistake to sacrifice the former entirely to the latter. The prohibition by the Army Council of anything approaching to combined manœuvres on a large scale by Territorial Divisions is no doubt sound. The Territorial soldiers must learn to walk before they can run. But it is quite possible and very necessary without infringing this prohibition, to give useful instruction in combined tactics on a small scale, during the annual training. The keynote of modern tactics is surely in the intelligent co-operation of all arms down to the smallest units. If the whole of the annual training of the artillery is given up to technical work with or without gun practice, neither the infantry nor artillery officers can make progress in this essential part of their military education.

It would not be unreasonable to expect that Territorial units should come to the annual camp sufficiently trained in battery and company drill to enable them to begin at once more advanced training. The experience of past years seems to prove that one day, or at most two, is sufficient to get the artillery teams into shape for manœuvre purposes. This can be relied on still more confidently in future as the earmarking of horses for mobilization is completed. Most London brigades at any rate will probably be able to arrange for the use in their headquarter drills of some of the horses allotted to them, and these will quickly pass into the category of trained horses.

But even apart from the consideration urged above of combined training, there seems no prospect of the London Artillery getting the use of land ranges more often than once in two years, and such biennial practice is not likely to amount to more than three days' shooting for each battery.

No one understands more thoroughly than the Territorial Artillery officers themselves how insufficient this amount of gun practice is.

What useful makeshift is then possible?

In the writer's opinion only the following:—It is well known to all gunners, and to most officers of other arms, that

a battery of artillery in action is a "one-man show" as regards its fire effect. The most perfect fire discipline, with its concomitants, rapid and minute gun laying and fuse setting, are useless if the battery commander is not able to work the machine. Now the work of preparing the machine, of perfecting the component parts is, even in the Regular Artillery, almost entirely carried out before the battery reaches the practice ground. Judged by the meticulous standard of the School of Gunnery, there is, it is true, some improvement noticeable in the handling of service ammunition, after a day or two of actual firing, but the practice ground atmosphere and conditions are somewhat artificial. In the writer's opinion there is no reason whatever why the preparation of the machine as a "fire-engine" should not be as thoroughly carried out in a Territorial battery as in a Regular battery, provided that the necessary zeal, which must take the place of compulsion, is forthcoming. The facilities are quite good, or they will be when the Director of Artillery sees fit to issue certain details of equipment. As regards personnel, it is a mistake to suppose that in the best Regular battery all are of equal value. There is always a percentage of second and third class men. So it will always be in a Territorial battery.

Another popular military illusion as to the Territorial Force may be touched on in this connection. Much stress is laid by critics of the Territorial Force on the fact that the Territorial soldier has only to do 20 drills a year. This is undeniable as far as his obligation goes. But in the brigades under the writer's command, and probably in many others, the average in good batteries is much higher, probably averaging 50 and rising in some cases to 80 or 90. How many gunners in a Regular battery do 50 gun drills of three hours each in a year?

Let us now turn to the battery commander and his understudies. None of these can possibly be made efficient by exercising their functions in actual practice on three days out of two years. It is of little importance what personnel compose the "fire-engine" to be worked by the battery commander provided they are efficient in their duties.

A TERRITORIAL SCHOOL OF GUNNERY.

What is required, and what seems to the writer the only possible means of giving instruction to officers of Territorial batteries is the establishment of a Territorial branch of the School of Gunnery, horse and field.[1] This School should be for gunnery purposes only, and need only be equipped as a minimum with sufficient horses to move the guns into position.

[1] Since this article was written (April, 1912) courses for training field officers of Territorial Field Artillery in manœuvre and observation of fire have been instituted at Buddon (Fifeshire).

All instruction in manœuvre, in tactics and in ammunition supply, should be rigorously excluded from its purview. Its sole object should be in dealing with gunnery problems, and even from these might be eliminated most of the complicated ranging from under cover which is thought necessary for Regular batteries. It should be made an absolute condition of retaining a commission in the Territorial Artillery that majors and captains should attend this School for a fortnight at least once in two years. They should not attend it in those years in which land ranges are available for their batteries. This fortnight's attendance would, of course, if desired by the officer, count in lieu of his attendance at annual camp in that year.

In his absence the training of the battery as a tactical unit can, and must be, carried on by the other officers.

It is of primary importance, to which all must give way, that the battery commander should learn to shoot his battery. It is, of course, true that certain facilities for obtaining instruction of this kind are already available for Territorial officers in the form of voluntary classes at Shoeburyness, and attendance at Regular practice camps. But these are not sufficient. The Shoeburyness ranges are quite unsuitable for field artillery practice, and no amount of looking on at the practice of other batteries will serve to give an officer confidence and skill in conducting practice himself.

The writer does not propose to offer any detailed suggestions as to the *local* and establishment of such an Auxiliary School of Gunnery, which would doubtless mean increased expenditure on the Territorial Force, but he is convinced as to the absolute necessity for it, in order to give officers the opportunity of obtaining systematic instruction in ranging a battery at service targets.

It is possible that brigades in other divisions are able to obtain sufficient practice over local land ranges to train their officers, but there is no prospect of this for the London divisions under existing arrangements.

In connection with the proposed obligatory course for officers, it may here be remarked that greater strictness is required in enforcing from officers attendance at courses and annual training. Far too much leniency has, in the writer's opinion, been shown in accepting excuses for non-fulfilment of the obligations undertaken by officers on accepting commissions. If private occupations prevent an officer from attending camp or the necessary courses he should be called on to resign his commission. This is a crucial matter, untrained officers are no use. If officers cannot be obtained under the existing conditions, if those conditions are insisted on, they must be provided in some other way. It is not fair to the nation or to the Territorial Force to retain officers who are not equal to their duties, and cannot, or will not, fit themselves for them.

No reference has been made in this paper to the question of compulsory training or service, and the omission is intentional. It is quite certain that there is no proximate prospect of the introduction of compulsory training, and such being the case, it seems to the writer more practical and useful to deal with things as they are, and with possible improvements. Such unexpected, unhoped for results, have already been obtained in the field artillery arm of the Territorial Force that the failure to provide the facilities without which further improvement is impossible will be sheer folly on the part of the authorities.

PROSPECTS OF THE TERRITORIAL FIELD ARTILLERY.

Territorial Field Artillery possesses certain valuable assets peculiar to itself in comparison with other arms. To assist recruiting there are the combined attractions of horses and guns, undoubtedly very great to the youth of the nation. To counteract the inherent difficulties of voluntary service, we have the advantage of what may be called "piece-meal" training. By this is meant that the numbers present on any particular parade, gun drill, driving drill, battery drill, are not nearly so important a factor as in the Infantry or Yeomanry.

As has been said above the parts of the machine can be fitted and polished separately.

It is probable that these and similar considerations did not present themselves to the military public when the question of the possibility of making Territorial Field Artillery was first discussed, and from what appears in the service and public press it would seem that they are not fully realized yet.

In giving expression to the opinion contained in this paper, the writer has no desire to paint everything *couleur de rose*. He fully realizes, as must every officer who has held a similar command, that an enormous amount requires to be done before the necessary efficiency is obtained. But he is firmly convinced that given the necessary facilities and, in addition, the whole-hearted sympathy and assistance of those who can provide those facilities, this efficiency can be obtained.

The late Inspector-General of the Forces, Sir John French, was undoubtedly right in recommending that the Divisional Commands of Territorial Artillery should be given only to officers who are noted for further full-pay employment, and that they should receive adequate remuneration whilst so employed. Officers rapidly become rusty in idleness, and cannot be expected to keep themselves efficient and up-to-date by attending Regular practice camps and manœuvres at their own expense, especially if they have no professional rewards to look forward to. The experience of those officers who accepted the task of training the artillery on the formation of the Territorial Force, was certainly not encouraging to others, and the Army Council have been practically forced to accept the recommendations of Sir John French, in principle, at any rate.

WIRELESS TELEGRAPHY AND TELEPHONY.

[Translated from *Nauticus* and published by permission].

IN 1910 Marconi and Braun were jointly awarded the Nobel prize for physics for their achievements in the domain of wireless telegraphy. The awarding of this prize to the originator of wireless telegraphy, Marconi, and to Professor Braun of Strassburg, in whose name stands the most important patent of the German Wireless Telegraphy Company (The Braun jar oscillator), has brought before the whole civilized world the great importance of wireless telegraphy at the present time. The joint award to Marconi and Braun may be regarded as indicating the general recognition of the value of the Marconi system and of the German system, that is, the Telefunken system. The joint Nobel prize has also proved to be a sort of introduction to an agreement between Marconi and the Telefunken Company, which is of the greatest economic importance.

Considerable technical progress has been made in the last few years, especially in Germany; at the same time there has been a very great increase in the employment of wireless telegraphy.

This article is mainly concerned with the economic and technical development of wireless telegraphy and telephony in recent years, and an attempt has been made to give a general view of its economic significance at the present time. Reference may here be made to previous articles in *Nauticus* on this subject. A knowledge of ideas and conditions which have already been discussed is assumed.

I. ECONOMIC AND TECHNICAL DEVELOPMENT.

A. MUSICAL QUENCHED SPARKS.

The important progress of recent years is the perfecting of the so-called musical quenched sparks.

Professor M. Wien of Jena, an appreciation of whose work has already been expressed in *Nauticus* for 1908 (page 488) published at the end of 1906 the first account of observations which he had made regarding the use of small spark-gaps. He found that whereas two partial waves are observed when using normal spark-gaps, with the small spark-gap the first wave is specially marked in the primary oscillatory circuit. The phenomenon originates, as Wien recognized, from the fact that the high resistance of the small spark-gap very rapidly damps the oscillations in the spark-gap circuit. The Wireless Telegraphy Company worked at this question, and produced, at

the end of 1908, after much trouble and many mistakes, a serviceable arrangement which permitted the practical employment of the "quenched spark-gaps," as the new kind of spark-gap was named. The production of a "quenched spark-gap" in a practicable form gave a great impetus to the development of wireless telegraphy, and has led to unprecedented results. The great importance of the "quenched spark" method results from the two following considerations.

It renders possible, on the one hand, the production in a simple manner of single wave oscillations, and, on the other hand, a considerable increase of the number of spark discharges in a second. These two considerations present a number of important advantages as compared with the old spark method. The most important of these advantages are briefly explained below.

The Single-Wave Oscillations.

In order to make clear the production of the single wave oscillations, and to recognize their importance, it is necessary to refer to the conditions obtaining with the old spark method. With the old method the oscillation sets in in the spark-gap circuit, and while giving off its energy is reproduced in the similarly tuned circuit to be excited, that is, the aerial. Then the energy flows back again from the aerial into the spark-gap circuit, returns again from the spark-gap circuit into the aerial, and so on, until the whole energy is emitted or is used up by losses in the oscillating circuits. This wandering to and fro of the energy from one circuit to the other is shown diagrammatically in figure 1. It is accompanied by two undesirable phenomena. The oscillating energy rising and falling in the transmitting aerial (*Senderantenne*) produces a wave which, so far as concerns its effect on the receiver, is impure and strongly damped. It consists of the so-called partial waves; these lie above and below the first waves to which the oscillating circuits are tuned, and thus render impossible the perfect tuning of the receiver, which is desirable in order to ensure reception free from interference. Further, this wandering to and fro of the energy is the cause of a very uneconomical working of the old spark transmitter. It is only the oscillation in the aerial which is of use to enable the energy to reach the receiver from a distance (emitted waves). During the whole time in which the energy oscillates in the primary spark-gap circuit there is, therefore, no wandering of waves to the receiver; on the contrary, the

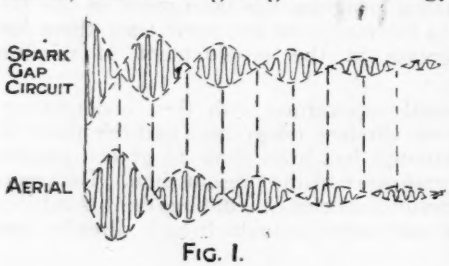

FIG. 1.

oscillations are to a considerable extent uselessly destroyed through harmful resistances in the spark-gap circuit, and particularly in the spark-gap itself.

With the quenched spark method this wandering to and fro of the oscillating energy, the results of which are so undesirable, is avoided. After the oscillating energy of the primary spark-gap circuit has wandered into the aerial, the condition of spark-gap, in consequence of the rapid conduction of the heat generated in the spark discharge, becomes such as to prevent the energy which reaches the aerial from again wandering back into the spark-gap circuit. The spark-gap is said to be non-conducting through deionisation. Its resistance is now so great that it can only again be made active by a pressure equal to that which existed at the commencement of the spark discharge. The energy in the aerial is now compelled to cease oscillating with weak damping. Figure 2 illustrates the action. The two above-mentioned disadvantages of partial waves and dissipation of energy in the spark-gap circuit are thereby avoided. The result of the quenched spark method, which is so called because it becomes non-conducting, or, in other words, because the spark-gap is quenched, is therefore an increase, and indeed a very considerable increase in the tuning capabilities of wireless stations, and also an increase in their efficiency. This means that, other things being equal, greater distances can be covered with quenched spark stations than with the old spark transmitters

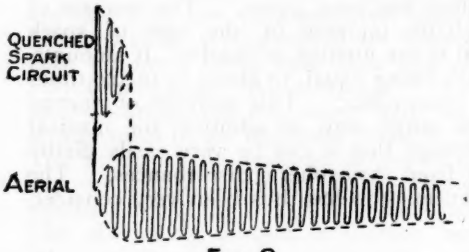

FIG. 2.

High Number of Sparks.

The characteristic of quenched spark-gaps, viz., their very rapid extinction by the conduction of the heat produced in the spark discharge, also permits the number of spark discharges per second to be considerably increased.

This is, if possible, as regards its advantageous results, still more important than are the single-wave oscillations. If a high rate of spark discharge were employed with the old spark-gap, such a quantity of heat would have accumulated in the spark-gap that its material would have been destroyed. The number of spark discharges per second therefore rarely exceeded 100, and usually 30 was the number employed. In consequence of the above-mentioned rapid conduction of the heat, the quenched spark-gap ceases after an extraordinarily short time

(1/100,000 of a second) to participate in the oscillation procedure. If now 1,000 sparks per second are assumed, the spark-gap has the very long (where discharges are concerned) time of about 99/100,000 (1/1,000—1/100,000) of a second in which to cool sufficiently to prevent the fresh supply of heat produced by each spark discharge from causing any injurious effects.

The importance of the high number of sparks lies in the very considerable increase in the transmitting energy, which produces in the telephonic receiver a musical note corresponding to the number of sparks per second. The most audible notes are those whose oscillations lie between the limits of about 200 to 3,000 per second. This production of a musical note in the receiver has resulted in the transmitter being called a singing transmitter, and in connection with the above-mentioned quenching procedure in the spark-gap the name of musical quenched spark transmitter has been given. The increase of energy obtained through the increase in the rate of spark discharge is proportional to the number of sparks. It amounts, therefore, other conditions being equal, to about 10 to 100 times the energy of the old transmitter. This increase of energy results in an increase of range, and, in addition, the musical note has the great advantage that it can be very easily distinguished at the receiver from atmospheric disturbances. The reliability of wireless transmission has thus been very considerably increased.

Technical Details of the Musical Quenched Spark Stations.

The high number of sparks in the case of musical quenched spark stations is attained through the employment of alternating-current machines of correspondingly high frequency for feeding the quenched spark circuit. A machine of 1,000 alternations produces 1,000 spark discharges per second. In order that these discharges may be produced quite regularly, use is made of other arrangements, a description of which must, however, be omitted from this article.

The construction of a serviceable quenched spark-gap, as has already been pointed out, was only achieved with great difficulty. The spark-gaps now each consist of two smooth circular silver discs, which are held at a distance apart of a fraction of a millimetre. Silver is chosen on account of its excellent heat conductivity.

In addition to these two fundamental requirements for the musical quenched spark system, there are a series of noteworthy technical improvements which have been introduced in modern stations employing this system, and which have simplified the working of the stations. Among these is the introduction of self-induction variometers at the transmitter, that is, an arrangement which permits, by a simple movement, any desired amount of self-induction within certain limits. They thus enable the transmitters to be very simply and rapidly tuned to the

desired wave lengths within certain limits. Further, improved change-over arrangements, from transmitting to receiving, and vice versâ, have been provided. This has much increased the rapidity with which messages can be exchanged. The Telefunken Company has also paid great attention to the improvement of the apparatus for giving Morse signals. There is no longer any difficulty in transmitting great energy at high speed if required.

The Receiver.

Many improvements have also been made in the receiving apparatus. The coherer as detector for the inker has gradually been wholly replaced by detectors for telephonic reception.

As detectors, so-called contact-detectors are now almost universally used, in addition to the well-known electrolytic detectors of Schlöhmilch. The advantages of contact-detectors are that they are very sensitive, and work without batteries. The receiving arrangements are therefore very simple. They had, however, for a long time one characteristic which was very troublesome, viz., incapability of offering much resistance to overloading, but this defect could be remedied by a suitable arrangement of the materials of which the detector is composed. The action of the detectors is due to the fact that the contact surfaces between a mineral or graphite and a metal, only allow electric alternating currents to pass through in one direction. The alternating current is thereby rectified. This rectifying action of the detectors enables the oscillations excited in the receiver, which are themselves inaudible, to produce a note in the telephone. Each wave series sent out by the transmitter produces in the receiver an approximately equally long series of weak oscillations, which are transformed by the detector into a continuous current of equal duration. This continuous current impulse when sent through the telephone attracts the diaphragm of the telephone. If 1,000 of such impulses follow one another in a second, the diaphragm of the telephone-receiver will be attracted 1,000 times in a second, and a note corresponding to this frequency is produced.

The construction of the coils used with receivers has been much improved. After many experiments it has been discovered how harmful losses in the coils can be reduced to a minimum. At the same time it has been found possible to construct the coils considerably smaller than formerly, so that the apparatus can be made in a more compact form.

Important auxiliary apparatus for telephonic receivers have been constructed; for example, a call-signal apparatus and a note strengthener. These are specially useful for stations at which there is not sufficient *personnel* for a man to be continually on the watch for possible calls with a telephone receiver at his ear.

The arrangement of the call-signal apparatus is as follows:

The needle of a galvanometer through which the detector current passes is deflected when the current has acted for about

10 seconds, or, in other words, when the transmitter has indicated a stroke of 10 seconds duration. If the transmitter gives the usual Morse signals, or in case of atmospheric disturbances which generally consist of short impulses, there is, owing to its inertia, no deflection of the galvanometer. The apparatus also contains clock mechanism which continuously moves a toothed wheel. If the needle is deflected in consequence of a call-signal—a stroke of 10 seconds duration—given by another station, the needle catches between the teeth of this wheel and is pressed against a contact. This closes a circuit and causes an alarm clock to ring until the operator again places the apparatus in its original condition.

The note strengthener makes the weak musical signals, which are generally only perceptible if the operator has the telephone receiver at his ear, so strong that they can be clearly heard everywhere in a room of medium size. The strengthening of the notes in systems which are in resonance with the receiving notes takes place in the following manner:—

The pulsating detector current is led through the winding of an electro-magnet. In front of this electro-magnet there is a light armature which has a natural vibration of the period of the notes to be strengthened. Against this resonance armature there lies a microphone contact. The movements of the resonance armature produce a periodic variation of resistance of the microphone contact. A continuous current led through the contact therefore experiences fluctuations of the same rhythm as the detector current, but of greater strength. The strengthened pulsating continuous current is again led through a resonance system; this being repeated until the desired strengthening has been attained. Finally it is led into a loud-speaking telephone, which emits the signals into the room. With the types of note strengtheners in use, three resonance systems are generally employed. The pulsating currents which are produced in the note strengthener are so powerful that they permit the use of Morse recorders. This method of reception is, however, not much in favour, as operators have greater confidence in their ears than in the somewhat complicated and unreliable mechanism of a wireless inker.

Serviceable Apparatus and their Performances.

To meet present requirements, the Wireless Telegraphy Company has developed a series of excellent types of transmitters. The types are designated according to the electrical power, in kilo-watts (K.W.), in the transmitting aerial. The ranges to be obtained with the various types can always be calculated for any desired power, on the assumption that, with an aerial power of 1 K.W. in the case of the usual ships' aerials, an average range of about 800 kilometres (500 miles) is attained, and that the range is approximately proportional to the square root of the aerial energy. With an aerial power

of four K.W. the range would therefore be 800 $\sqrt{4}$ = 1,600 kilometres (995 miles), and with an aerial power of .25 K.W., the range would be 800 $\sqrt{\frac{1}{4}}$ = 400 kilometres (250 miles). In calculating the range for a station it must not be forgotten, however, that the figures mentioned are mean figures, and that in many cases very much greater ranges can be attained, but that the ranges will often be considerably smaller. These differences of range are connected with the varying electrical condition of the atmosphere. The electrical condition is principally affected by the action of the sun's rays. During the daytime when the sun's rays are powerful the range is generally less than at night.

The following are the types of transmitters employed by the Wireless Telegraphy Company :—

Number.	Aerial Power.	Employment.
1	.2 K.W.	Lightships, fishing vessels, lighthouses.
2	1.0 K.W.	Medium-sized warships.
3	1.5 K.W.	Merchant vessels and small shore stations.
4	2.5 K.W.	Strengthened type for large warships.
5	2.5 K.W.	Strengthened type for steamships and shore stations
6	5.0 K.W.	Largest warship type; also for medium-sized shore stations.
7	5.0 K.W.	Largest merchant-vessel type.
8	10.0 K.W.	Large shore stations.
9	25.0 K.W.	Large shore stations; largest normal type.
10	.1 K.W.	Light portable stations ; also for warships.
11	.1 K.W.	Transportable wagon stations.

Twenty-five K.W. is not the limit for the aerial power. It is probable that this is unlimited, and consequently there is no limit to the range. It must be pointed out, however, that the rule given above, namely, that the range is proportional to the square root of the aerial energy, does not hold good for very great distances, more energy being necessary. Therefore, to transmit with certainty round the whole earth under present

conditions very much more aerial power than $\left(\frac{40,000}{800}\right)^2 = 50^2 =$ 2,500 K.W. is necessary (the circumference of the earth = 40,000 kilometres). This figure gives some idea of the enormous power which must be employed in order to transmit over great distances.

B. UNDAMPED OSCILLATIONS AND WIRELESS TELEPHONY.

Undamped oscillations on the arc system of the Danish engineer, Poulsen, were fully dealt with in *Nauticus* for 1908. As regards the arc transmitter no prominent and economically important progress has been made since then. The possibility of realizing in practice the theoretical advantages of this system was indeed somewhat over-estimated, whilst many technical difficulties appear to have been under-estimated. The system has been very carefully perfected for special purposes, for which it has proved very satisfactory. Progress has, in particular, been made in connection with wireless telephony, which is possible with the oscillations produced by the Poulsen arc. Under normal conditions the human voice can now be reliably transmitted to distances of 50 kilometres (31 miles) and over.

Wireless Telephony.

If appearances are not deceptive, the Poulsen system, in its special domain, is on the eve of a further sound development, though not to the extent originally expected by many people. The present position of wireless telephony justifies this conclusion. Wireless telephony has only just come into practical use, and up to the present only to a limited extent. The results obtained show that further progress may be expected in the near future. As soon as certain working difficulties which are now experienced have been overcome, and the ranges have been somewhat increased, wireless telephony will rapidly become an indispensable auxiliary, especially in places where it has not been possible to instal wireless telegraph apparatus on account of the cost of the necessary trained operators. Most people can now use a telephone without having to undergo any special and expensive training. But wireless telephony has also other advantages, even compared with ordinary telephony. For instance, it may be mentioned that in speaking with ordinary telephones over long wires, an alteration of the "talking" currents distorts the sounds and thus renders the voice unintelligible. Moreover, the means employed to prevent this distortion, the so-called Pupin coils, do not altogether remedy the defect. Now, with wireless telephony there is no wire to carry the sounds, so that these are not distorted. Consequently, from this point of view there is not the slightest reason why wireless conversations should not be possible over any distances that come into consideration on this planet.

A further advantage is that wireless talking can take place, practically undisturbed, at the same time as wireless telegraphy. The human ear is able to pick out the voice sounds from the Morse signals with great reliability. This increases the possibilities of wireless communication.

Finally, allusion must be made to the greater speed of transmission which is ensured by using the voice instead of Morse signals. A good telegraph operator can transmit about 120 letters per minute. With ordinary slow speaking, about ten times as many can be sent. This means, for example, that a message which would require the very long time of 15 minutes to send by Morse signals would only take one and a half minutes.

High Frequency Machine.

The difficulties presented by the technical control of the arc have caused efforts to be made to produce undamped oscillations in another way, in order to be able to make full use of the advantages which accompany the employment of such oscillations. Good work in this direction has been done by the German Lorenz Company in Berlin. After great efforts this company succeeded in constructing, in the summer of 1910, a serviceable high frequency machine in accordance with the patents of Professor Goldschmidt, of the Technical High School at Darmstadt. The machine is working at the company's experimental station at Eberswalde, near Berlin.

Dr. Goldschmidt's invention dates from the year 1907. The idea of producing electric waves direct from dynamos is, however, much older. The American, Fessenden, constructed machines of this kind many years ago, but they did not attain to any importance (see *Nauticus* for 1908). The construction of such machines on the principle of a normal alternating current dynamo presents great difficulties, and the smaller the desired wave-lengths the greater do these difficulties become. If a wave-length of 3,000 metres is to be used, a length which can be employed with advantage at a large shore station, then the alternating current machine must deliver a current of 200,000 alternations, *i.e.*, 100,000 periods per second. Normal alternating current machines produce a current of 50 periods per second, and machines of this kind having periods up to even a few thousands per second can be constructed without difficulty. If the construction of an alternating current machine be carefully considered, the great difficulties attending the production of a high frequency machine of this type on the normal principle, and therefore also the technical importance of the Goldschmidt inventions, will be clearly seen.

An alternating current is generally produced by means of wire loops embedded in iron and led alternately to north and south poles; either these are moved past the permanent magnets or electro magnets, or the magnets themselves are moved.

Every time a fresh pole is passed a current alternation is produced. The number of alternations per second is therefore dependent on the speed at which the poles are moved. If a pole-alternation takes 1/100 of a second, then the machine gives 100 alternations or 50 periods. If the machine is to give 200,000 alternations or 100,000 periods, then a pole-alternation must only take 1/200,000 of a second. The highest speed permissible, with due regard to the strength of the material, is 200 metres (656 feet) per second. Consequently, in a machine of 200,000 alternations there will have to be 200,000 poles in 200 metres. There is available, therefore, at the most for each pole a distance of 200/200,000 metre = 1 millimetre (.039 in.). It must also be remembered that there has to be an intermediate space between each pole, and that each pole must carry a wire winding. It is obvious that a machine of this kind cannot be advantageously constructed and cannot work well.

Professor Goldschmidt hit upon the idea of obtaining the high number of periods, not solely by means of many poles at close intervals and a high speed of rotation, but by increasing, by special reaction, the electric frequencies as desired. The procedure is roughly as follows:—a non-magnetic iron pole-wheel, between whose poles lie wire windings, is moved at very high speed past a fixed ring of magnet poles (stator), which are excited by a continuous current. The moving pole-wheel—the rotor—and the stator are identical as regards the dimensions of the poles and the wire winding. The motion produces in the rotor an alternating current of, for example, 10,000 periods, which is possible without special technical difficulties. (With a peripheral speed of 200 metres, the space for the pole and winding is 200/200,000m. = 10mm. (or .39in.).

If now this alternating current is not allowed to do work, but is enclosed by a condenser of suitable size, then there is produced in the rotor, through the alternating current in it, a magnetic alternating field, which is capable of exercising on the stator a powerful reaction. The result of this in the stator is an alternating current superposed on the continuous current existing there. The frequency of this alternating current is decided as follows. If an alternating current of 10,000 periods should flow into the stationary rotor and produce a corresponding magnetic alternating field, then this alternating field would result in an alternating current of 10,000 periods in the stator. With the machine under consideration, however, the rotor moves so rapidly past the stator that, with unaltered rotor magnetic field, an alternating current of 10,000 periods would be produced in the stator (which, as stated above, is identical with the rotor, and therefore can be influenced by the rotor in the same way as the rotor by the stator). With the Goldschmidt machine, therefore, the result in the stator is the sum of the effect of the motion of the poles of the rotor and the alternating current flow-

ing into the rotor. An alternating current of 10,000 + 10,000 = 20,000 periods is consequently produced in the stator. If this alternating current, also, is not allowed to do work, but is enclosed by a suitable condenser, it reacts again on the rotor and produces there, superposed on the existing alternating current, an alternating current of 20,000 + 10,000 = 30,000 periods. This procedure can be repeated as often as is desired within certain limits fixed by unavoidable losses. In order to produce, for example, 100,000 periods = 3,000 metres wave-length, with a machine which produces 10,000 periods in the first stage, the reaction of the alternating current must be effected nine times through the interposing of condensers, and the aerial must first be acted on in the 10th stage. With an alternating current machine which gives 20,000 periods in the first stage, which is technically quite practicable with the means now available, condensers must be interposed four times to produce 100,000 periods.

It is to be hoped that the ingenious idea of Professor Goldschmidt will prove of great service in the further technical development of wireless telegraphy.

C. DIRECTED WIRELESS TELEGRAPHY.

An attractive solution of the problem of directed wireless telegraphy has been worked out by Tosi and Bellini. The action of their arrangement depends on the following principle.

If electro-magnetic waves which are acting parallel to the earth's surface, *i.e.*, horizontally, strike a horizontally stretched wire, oscillations are not produced in this wire in all circumstances as is the case with a vertical aerial. If the on-coming waves strike the wire at right angles, then equal electric or magnetic forces act on the whole conductor at each moment. No electrical differences can therefore occur, and the conductor remains at rest. If the wire is in the direction of the on-coming waves, so that the waves in a sense glide along over the conductor, then various electric forces act each time on the various portions of the conductor, and differences of pressure are produced which result in oscillations. The strength of the resulting oscillations, other conditions being equal, depends on the position of the conductor relatively to the direction of the electric waves. The oscillations are strongest when the position of the conductor coincides with the direction of the waves, they become weaker as the conductor is turned in a horizontal direction, and finally disappear when it is at right angles to the electric waves. In this way the direction of electric waves can be determined. The turning of the aerial, which is necessary for this, generally gives rise to insurmountable difficulties. On board ship, however, the direction can occasionally be determined by this method, as it is often practicable for a ship to describe a circle. The positions of the aerial in which the reception is strongest or ceases can then be ascertained.

In order to avoid turning the aerial, Tosi and Bellini used two aerial conductors at right angles to one another. On the arrival of electric waves the following oscillation conditions occur in the two aerials. If one aerial is in the direction of the waves, then the other is exactly at right angles to their direction. In the first aerial, therefore, the strongest possible oscillations will arise, while the second aerial will not be influenced in any way. If the direction of the waves be altered 45 degrees, then both aerials will be struck by the wave-series at an angle of 45 degrees, and equally powerful oscillations must therefore be excited in both. If the direction of the waves be again changed 45 degrees, so that the total alteration is 90 degrees, then the electric waves will strike the first aerial at right angles, but they will pass along the second in a longitudinal direction. As compared with those in the first assumption regarding the relative direction of the waves, the conditions are, therefore, exactly reversed. In the first aerial no oscillations are now excited, whilst in the second the maximum oscillations occur. if the direction of the waves be changed a further 45 degrees, it is obvious that equally strong oscillations will again occur in the two aerials. If the same alteration of direction once more takes place, then the first aerial, as in the first case, is again in the longitudinal direction of the waves, though these strike it from the opposite side, whilst the other aerial is at right angles to the direction of the waves. The oscillation conditions arising in the aerials are consequently the same as in the first case. If the alteration of direction continues in the same way, then the conditions described will all reappear in the same sequence. If the alteration in the direction of the electric waves does not occur in jumps of 45 degrees, but takes place gradually, then the oscillation conditions in the two aerials also alters gradually. If a start is made from the position first assumed, then the strength of the oscillations in the first aerial will become gradually weaker, whilst at the same time the intensity in the second aerial will become greater.

If there were a simple method of accurately measuring the strength of the oscillations in each aerial, then it is obvious that conclusions could be drawn regarding the direction of the waves from the relation of the oscillation intensities to one another.

If the direction of the waves changes, from the assumed initial direction, to the right and then to the left, the difference in the intensity, and the ratio of the intensities in the two aerials to one another, are the same on each side provided the angle of turning is the same. In the aerial originally at right angles to the direction of the waves, however, the direction of the forces causing the oscillations is different when the wave-direction is turned to the left from what it is when the wave direction is turned to the right. The result of this is that the phase of the oscillations is not the same in both cases,

that is, whilst in one case, at any period, the electricity in the conductor moves to the left, in the other case at the same period it moves to the right.

The differences in the intensities and in the phases of the oscillations with various directions of the on-coming wave-series were utilized by Tosi and Bellini in order to read off the direction of the waves by means of a simple apparatus. This apparatus, which the inventors have called a "Goniometer," works as follows: (see Figure 3). The oscillations of the two aerials, which are at right angles to one another, are led into two induction coils, which are at right angles to one another and therefore uninfluenced electrically, just as is the case with the transformer coils used with ordinary receivers. The intensity and phase in these coils always correspond to the action that is taking place in their respective aerials. The two coils act conjointly on a wire loop which is in connection with the proper receiving apparatus—detector, telephone, etc. The wire loop rotates on an axis so that its position relatively to the two aerial coils can be continually changed. If the receiving wire loop is parallel to one aerial coil, then it is only influenced by this one, and not by the other to which it is at right angles. If its position is at an angle of 45° to both coils, then they are both equally influenced, exactly as happens with the aerials as described above. The direction of the on-coming electric waves can now be recognized from the positions of the coil, according as the reception is strongest or weakest (or nil), which can be established very simply and rapidly by turning the receiving coil.

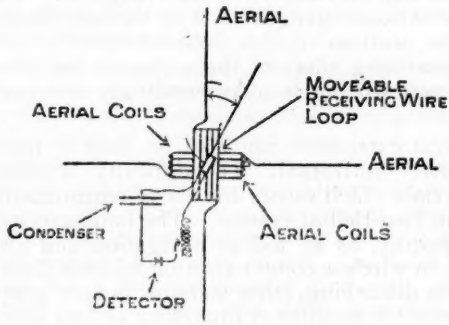

FIG. 3.

A few cases may be briefly considered. Let it be supposed that the waves are acting in the same direction as in the first case assumed in explaining their effect on the aerials, that is, along one aerial. Then the coil connected with this aerial has its greatest possible intensity, while the other has no current passing through it. The reception will therefore be loudest when the receiving coil is parallel to the first coil; with a 90° alteration of position, it will be weakest. If the direction of the on-coming waves be changed 90°, the effect is obviously the same as that due to turning the coil 90°. If the direction of the waves be changed 45° to the right, relative to their initial direction, the intensity in the two aerials, and therefore also in

the two coils, is equal. As regards the position of the receiving coil, the phase of the oscillations, referred to above, must now be taken into consideration. The phase conditions result in the oscillations of the two coils being combined as regards their effect on the receiving coil when the receiving coil is turned 45° to the right, whilst they exactly balance one another when it is turned 45° to the left. For other wave directions there are corresponding positions of the receiving coil dependent on the combination of intensity and phase differences.

In transmitting with an arrangement of this kind, the outgoing waves can be directed in a similar manner. The oscillation source is now what was previously the receiving coil. The aerials are inducted in various strengths and in various phases corresponding with the position of this coil relatively to the aerial coils. The transmitting effect of the aerials is therefore cancelled in certain directions, but is correspondingly increased in others.

Aerials with vertical extensions can also be used in place of those which are purely horizontal. The difficulty of installing on board ships aerials which satisfy the above requirements is the weak point in the Tosi-Bellini system. The importance of directed wireless telegraphy, as an aid to navigation and also as a means of carrying on wireless communication without disturbance from, and without disturbing, other stations, is very great, but at present the technical difficulties in providing aerials which will ensure adequate ranges are equally great. Directed wireless telegraphy is therefore still in its infancy.

D. OTHER TECHNICAL PROGRESS.

Following the example of Marconi, and stimulated by the great success of the German musical quenched spark system, the construction of musical systems has now been commenced everywhere. Rotating spark-gaps are used in most cases. A rapidly-rotating wheel carries extensions as electrodes, generally in the form of knife edges. These electrodes move past another electrode, also generally in the form of a knife edge. A spark is produced every time the electrodes pass each other. The note corresponds to the period which elapses between the spark discharges. The rotating wheel at the same time produces a powerful air current and thus ensures good ventilation at the spark-gap; moreover, the continuous changing of the electrode prevents the accumulation of heat to such an extent that it would endanger the spark-gap material.

A musical system has also been constructed by Engineer von Lepel. He influences the rate of oscillation by electric oscillation circuits, which have a frequency within the limit of the musical oscillations.

(To be continued.)

THE PROFESSION OF ARMS.

By Captain E. N. Mozley, R.E.

NO body of men can for ever maintain a resolute indifference to the sentiment with which the ordinary world regards them. *Securus judicat orbis terrarum* generally comes true in the end. It is, therefore, at times, useful for a profession to take stock of itself, to seek justification from that final court of appeal, its fellow-countrymen, and so obtain from them a greater measure of support. It is in such a spirit that the following confession is made to our civilian Overlords on behalf of the soldier's career.

Confession, indeed, is generally thought to be very alien from the military mind. Its owner is looked upon by the outside world, sometimes with admiration, sometimes askance, but always it is assumed that he is very well pleased with himself and very confident on the whole that he has got the best of this world's goods. His methods of life are fairly well known, and although our leading musical comedians have not perhaps so exceptional an entrée to his ways and thoughts as they would wish us to believe, yet there are few families who have not a bowing acquaintance with one or two men in the Army. Very true, the officer's grievances are almost as numerous as the questions in Parliament, which so often ventilate them; but these are not always taken very seriously. The victim is looked upon as a gentleman who skates over the real trials of life with considerable confidence, and who, with a few exceptions, has adopted his profession as a means of getting the best company that the world has to offer.

But along with all this pleasant outlook our civilian friends always tacitly assume that there exists a certain lack of weight and thought. They are aware that ours is the only profession in the world which may not be practised daily, and they have instituted another calling, that of Diplomacy, whose sole object it is to prevent us realizing our own; and they think to themselves—as indeed what soldier at times does not?—that men who pursue such phantoms must live in a continual realm of unreality.

They are careful to say that our profession is at best a necessary evil. Gentlemen like Mr. Carnegie are of a decided opinion that the adjective is a mistake. All alike affirm that they look forward with pleasure to our eventual extinction.

Moreover, they are rather afraid that we are a lot of *dilettantes*. They point to our hours of work, somewhat increased we all know in the last ten years, but still scarcely arduous, and they doubt if we devote that amount of thought and conversation to matters of greater moment—art, politics, and

the rest—as is common in their own circles. In a word, they treat us as exotics. How is the indictment to be answered?

Only by an appeal to themselves. When two people of brilliant but very different attainments meet it will generally be found that each tries to find out about the ways and thoughts of the other. His own he knows well, and unless he is an egoist or burning to gain a convert to some cause, he will not broach them. But to plunge into another world—to get another outlook on things—that is the treat each will desire, and their conversation will often become a duel for ground in which the better man will outmanœuvre his opponent and force a battle on the other's territory.

And in this combat we soldiers have invariably been worsted by our civilian friends and relations. They pretend to take a great interest in our doings. They insist on talking military "shop" to us. In war time they treat us as heroes, instead of, what we are trying to be, professionals. In peace, they pretend to treat us as professionals, which we are not, instead of as students. They pander to our conceit; one might almost believe that they are emissaries of a Government anxious to encourage recruiting by the use of introspective magnifying glasses. And, above all, they will not for an instant allow us to change the scene of action to their own territory, nor lay open to us the treasures of their own thoughts. In a word, they are much too clever for us.

Now undoubtedly a nation will usually get what it wants in the end. And if it likes to have an Army whose officers are to be out of touch with the ordinary affairs of life, no doubt it will get such an Army. That is to say, of course, if it behaves nicely enough to those whom it treats as curious and imperfect beings, altogether unlike anyone else. But if you who are civilians make this choice, it is not fair that you should come down upon us heavily, generally upon quite erratic evidence, when anything seems to go wrong with the Army machine; nor is it fitting that you should bewail the decadence of things military when any well-advertised *contretemps* occurs, which you think men with a wider outlook, such as you have so sedulously deprived us of, might have foreseen.

And after all, do you really want to treat us as a separate offshoot of the human race? Nothing shows more clearly the lack of perception of the "realities" which obtains among men than the fact that, while they have verbally segregated soldiers and clergymen from the rest of mankind by labelling their opposites respectively laymen and civilians, as though *these* were the two great Masonic professions, they have lumped in with the rest those real discerners of things unseen, those protagonists of humanity, the follower of the profession of medicine. Even the clergy, however, are not treated so childishly as are the officers of the British Army. We can

only recall one person on earth to whom is offered an equally reverential indifference—the Dalai Lama.

It is not in every nation that this curious relic of the times of Frederick William and his toy giants remains. The American and Colonial military officers mix freely with the rest of mankind. Their vogue is not at all brought about by an appeal to the eye and ear. Tunics and trumpets have very little to do with it. We must expect, of course, that in those armies, which are still considered to be the personal property of Rulers, the officer should be regarded as a sort of minor deity, an image without any power or virtue of its own, but merely reflecting that of the chief luminary. But those surely are not the models which the British nation intends its defenders to imitate.

It is difficult to think that sensible and energetic men can be entirely content with an environment in many ways so artificial. The desperate keenness with which officers seek for the chance of active service by itself shows how averse they are from the unreal atmosphere of for ever rehearsing the art of war. Excellent as is the life a man leads who is sent from the Curragh to India, from Gibraltar to the Cape, he can never be rid of the enervating make-believe which surrounds peace-soldiering. And when to this is added the reluctance of his civilian acquaintances to treat him as a person who is equally with themselves interested in the progress of events and thought —when obstacles are so often intruded between his professional creative ideas and their attainment—he soon either slips back into the groove of the trainer of men in certain stereotyped lines for a few hours a day, devoting the remainder of his time to sport and society; or else he gets restless and looks around for something better to do.

Such thoughts as these reflect, no doubt, less truth to-day than they would have done 20 years ago. But they will still meet with a response from many officers and from many of the non-commissioned ranks. We want rather more of the reality and bustle of life. We can find it nowhere except on active service, though there it is to be had in a magnificence known to no other professionals in the world.

Active service, however, as a practical redress for our apparent shortcomings is out of the question as a regular tonic. It is becoming more and more a homœopathic remedy. Half our officers and almost all the rank and file lay down their arms and return to the plough without having seen a shot fired in anger. The policy of frontier delimitation and pacification, of boundary commissions and arbitration awards has been carried so far that not even stones may now be thrown at the glass houses which lie beyond the edge of the British Empire. The desert itself often proves to be a sad source of disappointment to medal-hunters. *Omne ignotum pro magnifico* is all very well, but knowledge brings disillusionment.

The fact is that the average soldier has to make his reputation in peace, or not at all. Peace is to be the scene and condition of almost the whole of his professional career. Her possibilities must be ascertained, and her opportunities not merely seized, but created.

Putting on one side the more technical branches of the Army to which, however, much of what we are about to say will apply, the practical question for every keen officer in the cavalry and infantry is this:—"How, in the comparatively short career that is offered to me, can I get a show of my own which will at once be serviceable to my country in the possible event of war, and interesting and profitable to myself and my men in the certainty of peace?" The solution of this question will go far to restore to its proper level the decreasing number of candidates for commissions in the Army.

Professionalism essentially involves intensity of effort, and intensity demands definite periods of abeyance. It is not only unnecessary but impossible for a first-class professional to remain always "*en état de partir,*" a truth which applies equally to the private and to the officer. On active service one must always be ready, always among comrades, always talking shop; in peace the atmosphere should be more varied. It is suggested, therefore (with some diffidence), that in the first place all ranks should be given a more regular and precise time table; the factory whistle, properly modulated by the sergeant-trumpeter, might well be introduced to give to the day's work its definite limits. The private soldier has at present his parade hours, but while these are less than onerous, he lives, except when on pass, in a kind of half-world of his own, a state which has in some ways a curiously depressing effect on his character. The commissioned officer is in an equally uncertain position. His duties, although laid down in a hundred text-books, are in many ways vague enough. Only on rare occasions throughout the year can he slip the leash, muster his men and practise to fair content the art of war. For most of the time he has to tread a very narrow path indeed. His sense of duty and the traditions of the service require him at least to avoid the appearance of being bored, but he cannot *make* work, and if he has to remain on the barrack square or in stables for an obviously unnecessary length of time, his respect for his profession is not increased. Making work has been a curse of the service, and is the one evil from which civilian pursuits are generally free.

Nor is it alone in his working hours that the career of the young officer lacks definition. Excellent in most ways as is the mess system, it certainly has the effect of stereotyping manner and thought. The constant presence of his official superiors is not conducive to mental ubiquity.

This peculiarity of being always professional, shared alone by the clergy, seems to have as its Hegelian opposite the result

of never being sufficiently so. If this be true, may not a remedy be found in concentrating duty into definite hours, as is done by all the rest of the world? We might at least forego the doubtful and laborious requirement of supervising the soldier's spare time, in which so much of the present "crime" in the Army is involved. This point of view is indeed indicated by those recent orders at Aldershot, which put the soldiers on their honour when on pass, and dispensed with the town patrols. The case of the officers' mess requires more subtle treatment, as the life there is in many ways very delightful and the necessity of a change by no means so evident.

A very young officer was once heard to say that he hoped our next war would be with gentlemen who would be sufficiently sportsmanlike to arrange their battles in the morning so that troops could get back to camp in time for polo in the afternoon. In making this remark he was arguing from good grounds of experience, as the time table of field days used to be pretty generally arranged with some such object in view, and there was great consternation if the pre-conceived battle programme was upset by some commander who had too successfully studied the art of being unexpected. But things are done differently now, and, as all the world knows, from the hour of "declaration of war" in the autumn manœuvres no man's sleep is safe nor dinner certain. And there must be manœuvres so long as there are Army Estimates.

Complete abstraction from the world is therefore a necessity for these short and expensive periods of training. No one would wish it otherwise for, except in the worst weather, these are the best parts of a soldier's yearly round, and those in which he most completely justifies himself. Such periods really require still more development, and all who have read Kipling's "Army of a Dream" will remember the magnificent possibilities which unlimited licence in manœuvre would give to keen men. The situation of the column which was forced to surrender its pay to its captors is one which would make for extreme efficiency, though it would be safer to be a football referee than an umpire in such soulful fights. But to all these extensions the Department of the Chancellor of the Exchequer stands as the lion in the path.

After all, however, manœuvres and other technical trainings occupy but a small part of the Calendar year, perhaps two or three months. It is in what used to be called the leave season that we sometimes doubt the necessity of our official existence, and this because work is rather extensive than intensive.

One of the greatest obstacles in the way of any change into normal lines is the fact that the Regular Army is housed in barracks. There are, probably, two principal reasons for this. The first, which was the original one, is to have the troops in hand for an emergency; the second, obvious but unconvincing,

that the barracks are there and must be used. The system comes down to us from the bad old times of riot and repression when the country was held, as many are held to this day, by the fear of the Royal Army. The need for this is not now so obvious in Great Britain. This vast living-in system is, to a larger extent than people are perhaps aware of, demoralizing to the common-sense and personal efficiency of young men. To live by rules rather than by rule, to have not only care but thought banished from the daily round, to feel one's going out and coming in watched not only by God, but also by man, and minutely adjusted into the bargain—all these things give a sense of irresponsibility, which, the writer has often been told, has been noticed by all employers of reservists. The argument that masses of men must not be turned loose on an innocent community is quite unconvincing.

If the private soldier were ordered to parade at eight and come off duty at five, and for the other fifteen hours were told to fend for himself with the additional pay which the saving of board, lodging, and barrack staff gave him, a vast amount of trouble and fatigues would be saved to himself and to everyone concerned in teaching him to fight. And then at last would appear that long-promised event, the daily training of the *whole* of a company by its captain.

But we have strayed from the subject of the British officer in whose defence this article opened. Corresponding to barrack-life, the necessity of which has been questioned, is mess-life, and to lay hands on that fine institution is as the sin of Uzzah. We will try a little later on if we can avoid such an iconoclasm.

One thing can be clearly seen. The military profession is the only one save that of the sea where the scene of action is not spread over all parts of the country, but which has been definitely localized. And it is this localization more than anything else which is responsible for the separation of the officer from his fellow men. In fact, the garrison atmosphere is to him what the black coat is to the clergy, a seal of separation. If soldiers were as much a part of the life of the countryside as are doctors and policemen, they would cease to be looked upon as abnormal, and sometimes as improper. We are speaking now of service at home; foreign garrisons can never be very different from what they are at present. So long, however, as it remains the national policy to mass its defenders in certain, chiefly south country, centres, so long will they remain a peculiar people.

Very good reasons must be brought forward to support any proposal to alter the present topographical organization of the military forces in the United Kingdom. What are the ideas, then, which form the basis of the present arrangements?

There are three chief conditions to be fulfilled. In the first place for the purpose of rapid mobilization it is sound to

collect men in masses especially near the metropolis and the exposed sea-coasts. With the present facilities for movement in the Kingdom this condition is, however, of less importance than formerly. Secondly, for purposes of training, men must work together for a certain part of the year in brigades and divisions, and therefore the time and expense of transportation are, to some extent, bars to a wide extension of the military forces over the country. Finally, for purposes of ceremonial it is found to be useful to have plenty of troops near London.

A reason more powerful than all these put together is the actual existence of barracks at the present military stations. This ensures that no very radical alterations in the direction of dispersion will be made for some time. That, however, is no reason why the question should not be discussed on its merits.

The question of localization for ceremonial occasions is of less importance than the others, and could easily be met by the assembly of the troops quartered in the vicinity of the metropolis.

As regards the question of mobilization. The fact that a chain is only as strong as its weakest link is known to no one better than to the organizers of our defences. Yet it can scarcely be said that our coast-line is equally invulnerable throughout in proportion to its accessibility. From Harwich to Plymouth the frontier is well watched by the large number of troops in Essex, London, Kent, Aldershot, Salisbury Plain and the dockyard towns. From Harwich northwards and all along the west coast the country appears to be less well protected. The west coast is, of course, not so accessible to an enemy, but the northern portion of the East coast certainly deserves as close a watch as any part of the country.

The military training of units is becoming more and more a matter of huge and prolonged summer camps. Many of the summer months are spent by the troops of the field army under canvas carrying out technical and combined trainings. This development is, of course, commendable. But the training in the winter months, from October to May, a period which includes the furlough season, and during which the more elementary and individual work is carried out, might as easily be done in the country towns throughout the Kingdom as in cumbersome centres, such as Aldershot, or impossible training stations such as are most big towns. Indeed, there are large parts of Great Britain which would be glad to see more of the Army than they do at present, places where preliminary training could be efficiently carried out, and where officers would have a much better chance of meeting the rest of the world on natural terms than is the case at present.

It requires but little imagination to see how entirely satisfactory from a professional point of view would be the situation of a small British Commando established in a country district,

and given as far as possible a free hand in carrying out its own training. The simulated cynicism of so many officers, and the lack of "fire," which, though perhaps not so frequently as of old, characterizes British troops in peace time, can be directly traced to the almost hopeless difficulties encountered in carrying out individual training. Only when the Military Manœuvres Act has been put in force can the Army "find" itself, and then command is taken out of the hands of the juniors, who become mere dusty pawns in the great war game of the Staff. It would, of course, be totally incorrect to say that manœuvres only benefit the higher ranks; quite otherwise. Every one learns most valuable lessons. But after all, young men of 25 and upwards, if they are fit for anything at all, are fit for untrammelled though not unwatched responsibility. Napoleon himself said that if a man was not fit to be a general at 30 he never would be.

Imagine then a couple of hundred infantry and half a dozen officers under field rank set down in the little country town of Newark, on the conclusion of the autumn manœuvres, to carry out a winter training until the summer calls them again to the rendezvous of a higher command. Arrangements will have been made for the whole unit to take its leave and furlough at the same time, and consequently for some seven or eight months every man of the force will be available every day. No domestic provision of any kind is to be made for the men, but as Newark will have experienced this sort of thing before, a class of licensed landladies for soldiers will have sprung up, not unlike their sisters at the Universities. From these lodgings wend their way at a quarter to eight every morning the two hundred to military headquarters.

These headquarters call for description. In place of the well-known buildings of an infantry barracks—men's dormitories, cookhouses, canteen, recreation rooms, guard room, and so on—what have we left? Principally two things; a very small office and a very large workshop. The office should be regarded as a necessary evil, the scene of as little as possible of that feverish clerical activity which, in past times, contentious officers and bald-headed N.C.O.'s have loved to display. We may leave it with a hope that its popularity as a residence will be a minimum, and will turn to the workshop, which is to be the intellectual centre of the unit.

The workshop building would serve two purposes. It would be the class room where, on the necessary occasions and during bad weather, the troops would be taught the theoretical side of the art of war, and also certain practical duties. The latter would comprise some of the preliminary musketry exercises (including if possible a Morris tube range), pioneer work such as knotting and the use of explosives, physical exercises and gymnastics, semaphore and flag signalling in its elementary stages, first aid, and so on. It would also contain such artificers' appliances as would give to the men a certain pro-

ficiency in trades which would not only be useful in war, but would also equip them to earn a living when they left the Army.

Undoubtedly the cost of supply and upkeep of a large number of forges, lathes, etc., would be heavy, and would require to be justified. It is not necessary to turn the whole of the Army into engineers, and although the opportunities for the skilful employment of material in war are continually increasing, the main justification of so extensive an outlay would be found in the increased popularity of the service and the improved efficiency and character of the men. While there is nothing in the world like a campaign for making a man of a soldier, the skilled trades, when not too technical or refined, appear to impart to those who are proficient in them something of the fire and stubbornness of the materials upon which they are directed.

Under some such scheme as this the energies of a body of troops stationed in one of our country towns would be directed into three channels. Firstly, the theoretical side of warfare, which their officers would teach them in the workshop. Secondly, the application of this study to the countryside around them. Thirdly, the learning of a trade.

Of these the second is the most important. After all the great art of war is the appreciation and correct use of ground, and this art will continue to predominate until the airmen throw all the military learning of centuries into the waste-paper basket. And how much more interesting and useful it is for soldiers to be given a constantly changing environment, the possibilities and problems of which are always presenting new features, than to mass in certain well-known garrison towns where every fold of hill has long ago been known and discounted.

No success could be looked for in such methods of training unless the goodwill of English farmers were obtained. It is not unlikely that a small unit would have much more latitude given to it than a large garrison can hope to obtain. And here, perhaps, would be found one of the conspicuous benefits of breaking down the present military segregation. There would be a chance of establishing a traditional friendship between farmers and soldiers even though the latter frequently changed their station. It might well become the custom to insert a clause in the leases of land owned either by private landlords or by public bodies, giving a reasonable right of way to the troops. Farmers who have allowed 300 wild horsemen to cross their fields and jump through their fences, consoled only by an occasional dip into the Hunt's poultry fund, would scarcely refuse access to a disciplined body of troops, if they were fairly treated on occasions when compensation was necessary.

And what provision is to be made for employing senior officers? It is not necessary to discuss here all the changes which would be involved, but this is a question to be met.

It would be sound to group together three or four such stations as we have described and to call them a regimental district. The Colonel of the regiment or battalion and his Adjutant would reside at one of these, and upon them would devolve the duties of constant inspection and of planning and superintending as umpires combined schemes; furthermore, into their hands might be put nearly the whole of the clerical work which has hitherto been done by squadron and company officers. Such clerical work would be greatly reduced if the barrack system were abolished.

The further problem of the employment of the brigade and divisional staffs through the winter season would be solved on similar lines. Their own work, the command and administration of troops in war, would be continued by staff rides and similar schemes. A considerable reduction of the permanent numbers of the staff might be made and their cadre filled in the summer trainings by a succession of regimental officers trained in turn at staff duties. This constant interchange would not only bring into closer touch with each other the regimental and staff sides of the Army, but would also facilitate that improvization of staff officers which the casualties of war and the enlargement of operations invariably necessitate.

Such a decentralization as has here been sketched would modify, but would not destroy the officers' mess. Its size would be reduced; double companies or squadrons might be the units at a station, and the members of the small messes so formed would be a great deal better known and more popular in the neighbourhood than officers can be at a large garrison. They would obtain a broader outlook and a very pleasant acquaintance with all kinds of life. Reciprocally such a distribution over the country could not fail to be generally popular, nor to enliven many a quiet country town. And above all, captains and subalterns would be able to attain real responsibility and opportunity for individual direction and effort. The Army would become a reality in places where to-day a soldier is scarcely ever seen, with excellent results on recruiting.

It is probable that future changes of Imperial policy will result in an increase of the proportion of troops on the Home Establishment. South Africa, for instance, will undoubtedly provide for her own defence within 20 years or so. The Crown Colonies are not likely to require larger garrisons. Even India and Egypt in 50 years time may offer a less grave military problem than they do to-day. Transportation facilities are increasing so rapidly that many of our foreign stations could be more or less watched from England at a considerable saving of expense to the country. The chances are, in fact, that more and more of a soldier's time will be spent in the United Kingdom. In any case, it would be worth while trying on a small scale such a scheme as we have here presented. Under proper inspection and safeguards it would not be likely to fail.

COLLECTIVE FIRE.

By CAPTAIN L. H. TUDOR, 24th Regiment.

IN the following article on Collective Fire, it is not presumed to lay down any new principles of Fire Tactics since these are already well known and legislated for in our text books. But an attempt will be made to consider the whole of this all-important subject in logical sequence, and in as simple and direct a manner as possible, from the point of view of those primarily concerned—viz., the infantry company commanders.

In order to clear the way for a more detailed consideration of the subject in a subsequent article, it will be necessary to state briefly, in so far as they affect Collective Fire, the main principles which govern the production and application of fire on the modern battlefield, so that the place which this type of fire fills may be viewed in the proper perspective.

FIRE AND MOVEMENT.

As a preliminary let us first call to mind the material which will be available on first going into action.

A British company at war strength may be taken in round numbers at 100 rifles, and assuming that each man will carry at least 200 rounds, the company commander will have at his disposal some 20,000 rounds. This is a large amount of ammunition, and the question each and every company commander has to consider and be able to answer is "How can I, who am primarily responsible for the translation of this latent force into active energy, do so to the best advantage of my own company and those of my comrades?" or in other words, "What principles must I bear in mind if I am to use to the best advantage on the battlefield the fire power of the company which I command?" Speaking generally, the object of all fire on the battlefield is to facilitate or prevent movement, since it is by movement, assisted by fire, that all battles are won. On the one hand the attackers will seek to bring about the final decision by advancing under cover of their own fire, as quickly and with as little loss as possible, to close quarters till the assault or threat of assault can be made. On the other hand, the defenders will endeavour, by opening fire at the longer range, to keep the attackers at arm's length as long as possible, thereby gaining time, reducing their numbers, and destroying their *moral*; or, by temporarily withholding their fire, they may seek to create favourable opportunities for assuming the offensive, to gain all the advantages of fire surprise—with its particularly demoralizing effects—or to induce their adversary to make premature attacks which will interfere with the timing of his movements and destroy his co-operation, which is a necessary condition of his success. *Fire and movement, therefore, must never be dissociated in peace training and must be regarded as complementary in war.* This may be considered as a first principle which the company commander must bear in mind.

SUPERIORITY OF FIRE.

Let us now consider how it is to be applied on the battlefield and what further principles spring from this main one. Very little consideration will show, that if the adversary's fire is superior in effect to our own, movement will be impracticable or inadvisable owing to the losses suffered; and that therefore a necessary accompaniment to movement is not only fire but Superiority of Fire. *To enable movement to be pushed home at the decisive point Superiority of Fire must then first be obtained at that point.* This therefore may be enumerated as a second principle.

The question now arises how can this be attained? Superiority of Fire may be defined, as the condition in which, having regard to relative numbers engaged, the loss inflicted on the enemy is in excess of that caused by his fire, and as a result the fire of the weaker side gradually slackens and perhaps ceases altogether. This condition is brought about by developing a great volume of carefully regulated fire delivered in accordance with tactical opportunity. But since the greatest volume of effective fire can only be produced by a dense firing line within decisive range, it will be the first object of the assailant in the decisive attack to close with the enemy, as rapidly as possible, without suffering undue loss, and overwhelm him with fire at close range.

THE FIRST OPENING OF FIRE.

From the above, therefore, it is evident that much will depend on the range at which fire is first opened and on its amount and efficiency. While on the one hand premature firing involves waste of time and ammunition and reduces the chance of producing a fire surprise, yet a considerable volume of fire will be necessary if adequate effect is to be attained. Further, as established by the first principle, covering and supporting fire must be provided to make movement possible, and, if the opening of fire on our own part is delayed too long, the intensity and accuracy of the enemy's fire, undisturbed by our own, will cause so many losses and affect our *moral* to such an extent, as to jeopardize the formation of a thick firing line within effective hitting distance. The first opening of fire, whether in attack or defence, is therefore a matter of much moment to the company commanders, and may well be regarded as one of their most important duties in connection with the correct use of the fire power which they will be called upon to direct and control, in accordance with orders received from superior authority, whenever they go into action. Plainly and briefly the two primary questions which we must ask ourselves will be somewhat as follows:—

When am I justified in first opening fire?
What is to be the type of fire I must employ?

As regards the first question, we have already seen that forward movement (which is essential for success) is dependent on mutually supporting and covering fire which makes the enemy keep his head down and disturbs his aim, thus interfering with the efficacy of his fire. To develop this covering fire for the infantry is, of course, the principle task of the artillery and often also of the machine guns, but on many occasions, when the ground is suitable, special bodies of infantry will have to be detailed, in addition, to afford long range covering fire. Again, incidents of battle and the nature of the ground often allow of opportunities for the use of converging fire. This kind of fire when directed from two or more widely separated positions against an interior one, is extremely effective and generally produces decisive results, but now, owing to the increased range of modern weapons, converging fire can be produced from one front, as well as by concentric attack or envelopment, and it is generally regarded as one of the decisive agents of the battlefield. Here, again, there is obviously a use for long range fire. Enfilade and oblique fire, which produce the greatest moral and material effect, are also greatly facilitated by modern weapons since they can now be applied from a considerable distance. Further instances will occur on every battlefield when the enemy present such a favourable target that fire at the longer ranges will be justifiable; and, lastly, the defence will often be quite justified in expending ammunition at long range in order to gain time by delaying the attack. Because the targets presented by the attackers will usually be large and visible, there should be less cause for anxiety about ammunition supply, and, if ranges have been judiciously taken, the fire of stationary troops, resting their rifles behind cover, should have greater assurance of effect than that of the infantry opposed to them.

These are some instances of the employment of long range fire, opened while the opposing forces are still separated by a considerable distance.

We must now, however, in order not to create a false impression, look very briefly at the other side of the question. In the decisive attack the troops detailed to carry out the attack should reserve their fire as long as possible, *i.e.*, till the effect of the enemy's fire compels them to answer and subdue it. Some of the reasons for this statement are as follows. Time is very precious; surprise effect is facilitated by reserving fire; superiority of fire is only attainable at close range, therefore this range should be reached as soon as possible; in view of the difficulty of replenishing ammunition pockets at short range, the men should arrive with an ample supply in the decisive zone; there is difficulty in seeing and hitting the target at the longer ranges; fatigue and moral exhaustion are reduced by the delayed opening of fire; the commander's intention must not be revealed sooner than is absolutely necessary; and, lastly, the spirit of the offensive and *élan* are favoured.

In the defence, as has been already stated, fire will often be reserved for use at the shorter distances, to obtain decisive effect by fire surprise and counter-attack, if certain conditions, such as a well concealed position behind cover, a good field of fire, special facilities for developing a counter attack or numerical superiority are present.

TWO RÔLES FOR THE COMPANY COMMANDER.

It may be considered then as fairly established that in the attack, the company commander must be prepared to play two varying rôles according to the task allotted to him by his superior commanders, who are responsible for the fire organization of the battlefield and for the detailing of units in accordance with that organization. In the one his unit will be more or less immobile, and he must be prepared to act to a great extent by fire alone at the longer ranges; whilst in the other, his main object will be, while covered by the fire of his comrades, to push in as quickly and for as long as he can without opening fire, in order to take part in the struggle for fire superiority at the closer ranges preparatory to delivering the assault. In the first case therefore he will be justified in opening fire earlier in the action and at a greater range than in the second.

In the defence also, as has been already stated, fire may be opened at long range or reserved for use at short distances, according to circumstances.

THE TYPE OF FIRE TO BE EMPLOYED.

Having reached this stage in the solution of the first question, the next step to be considered in logical sequence would be the actual range limit beyond which the order for the first opening of fire would not be justified. But since this question of range is closely bound up with the second question, viz., "What nature of fire is to be employed?" it would perhaps be best to consider this question first.

It is found in practice that, owing to various factors which produce increased difficulties as the range increases, 600 yards may be taken as the limit at which fire opened without orders from a fire unit leader, *i.e.*, "individual fire" is effective. These factors are, the invisibility of the service target, which is usually the head and shoulders of an individual clad in neutral tinted clothing and partially concealed behind cover; the difficulties in finding out the range and observing the results of individual fire; the errors inherent in rifle and ammunition, and the difficulty in correctly estimating and allowing for the variable atmospheric influences. Under service conditions, therefore, effect must be looked for from the fire of several rifles combined and controlled for a definite purpose under the orders of a fire unit leader, rather than from individual effort; or, in brief, *the nature of the fire to be employed must be "Collective" and not "Individual."* As regards the actual range limit for first opening of fire in the attack, we have already seen that the

greatest will be reached when the company commander is called upon to fulfil the first of the two rôles which may be allotted to him, viz., that of furnishing long range covering or supporting fire. There are many and complicated factors, *e.g.*, the volume of fire employed; the facility for observing the results of fire; the knowledge of the range and error of the day; the nature of the target; the training and *moral* of the men; the skill and knowledge of those controlling and directing the fire, which affect this question. For the purposes of this present article, however, it will suffice to state that the collective fire of the company, when skilfully directed and well controlled, may produce material effect up to about 1,400 yards, but that beyond that distance the expenditure of ammunition will seldom be justified under normal circumstances.

For crossing the fire swept zones—the second rôle—it is impossible to lay down the exact range at which fire should be opened, since it depends chiefly on two varying conditions, viz., the effect of the enemy's fire and the nature of the ground. While keeping in mind, however, the main principle of pushing on as long as possible without opening fire, it may reasonably be assumed that even under the most favourable conditions, *e.g.*, good covering fire, suitable ground, or bad shooting on the part of the enemy, it will more often than not be impossible to reach the range at which individual effort will be of any value, viz., 600 yards—without opening fire. (It is not intended to imply by this that collective fire should cease at 600 yards since fire should naturally be kept under control for as long as possible), and that the company commander must therefore nearly always be prepared to use some form of Collective Fire when he first decides to answer that of his opponent. To sum up, then, it may reasonably be concluded, that in the examination of this subject the following deductions have been arrived at.

CONCLUSIONS.

That at the commencement of any fire-fight the company commander must be prepared to employ Collective Fire.

That he may be justified in ordering the first opening of this fire at any distance up to about 1,400 yards; and that although the actual distance, within this range, at which fire is first opened, will depend on the rôle which he is playing, that this kind of fire should be maintained as long as control of fire is possible, at least to within 600 yards of the enemy.

This then would appear to be the place which Collective Fire will fill on the modern battlefield; and it is clearly incumbent on all those who will be responsible for controlling and directing it, viz.—the officers and non-commissioned officers of the infantry companies—to have sufficient knowledge, obtained by correct study and training in peace, to enable them to do so to the best advantage in war. It is proposed, therefore, that this question of fire direction and control shall form the subject for further examination and consideration.

THE WAR IN THE MEDITERRANEAN.

(a) General.

During the past month active operations on the Tripoli coast were resumed at three different points, *viz.*, at (*a*) Zanzur on the 8th June, (*b*) Homs (Lebda) on the 12th, and (*c*) Bu Sceifa, eight miles from the fort of Mesurata, on the 16th. As usual, the Turkish accounts admit but a small measure of success to the Italians, and state that whatever success the latter did achieve, was only at the cost of considerable losses. However, in the first and third operations noted the Italians certainly gained some ground, and eventually repulsed the Turkish attack in the second.

Conversations continue regarding mediation and proposals to terminate the war, but nothing definite has yet been achieved.

ITALY: *Casualties.*—Fifty-eight officers and 970 N.C.O.'s and men have been killed or have died of wounds since the beginning of the campaign up to May 1st.

No statistics of casualties from wounds and from sickness have been published in the Press.

FORT AT AIN ZARA.—A large fort has been built by military labour at Ain Zara. The works and defences are made of stone excavated on the spot, and good water has been fond at a depth of 80 feet.

One hundred and five Arab Chiefs have signed a proclamation in Tripoli inviting their fellow tribesmen to give up a useless resistance against the Italians.

The recent activity in Libya has had a good effect on public opinion in Italy.

TURKEY: *Expenses of the War.*—To meet expenses incurred by the war and the precautionary mobilizations of troops, 25% has been added to the Turkish land taxes, and various other smaller imposts made. The Government estimate that from the increased revenue so derived, it will be possible to secure a capital sum of about five millions sterling.

(b) Operations in Libya.

In spite of the approach of summer, the Expeditionary Force in Libya has not been inactive, and various military operations have taken place in Libya.

Western Theatre of Operations.

RECONNAISSANCES FROM BU KAMESCH.—(See map in May JOURNAL, page 713). On May 14th, General Garioni sent out a mixed column from Bu Kamesch to the Tunisian frontier. The force started at 5 a.m., and left communicating posts along the 13 miles of road. A detachment of Bersaglieri pushed forward and reached the frontier at 8.30 a.m.

On May 20th, General Garioni sent out a column from Bu Kamesch to capture a caravan which was expected to use one of the caravan routes from Ben Gardane. The force employed consisted of three battalions, five companies of Askaris, a mountain battery, and a section of a Q.F. battery. After going six miles south-west from Bu Kamesch the Italians found the enemy entrenched on the caravan road and drove them from

their trenches. The Turco-Arabs counter-attacked, but were again repulsed. The Italian losses were one killed and 26 wounded.

On the 24th May, General Garioni again pushed forward a reconnaissance to the caravan roads, and on the 28th a mixed column from Bu Kamesch found the country as far as the Tunisian frontier clear of hostile troops.

On the 27th June, General Garioni gained a brilliant success over a Turco-Arab force, estimated at 6,000, which was entrenched near Sidi-Said. The position was captured by a combined frontal and flank attack. The Italian losses are given as 20 killed, and 112 wounded; those of the enemy at 500 killed. Further particulars of this action will be given in a subsequent number.

ADVANCE FROM TRIPOLI ON ZANZUR.—On the 8th June an important movement was undertaken for the purpose of driving off and defeating the large force of Turco-Arabs who had assembled in the Oasis of Zanzur, 12 miles south-west of Tripoli.

The Italian objective was the Turco-Arab position on a range of hills dominating the oasis. The general course of the operations may be followed by reference to the maps on pages 251 and 252 of the JOURNAL for February, 1912. Gargaresch, which was occupied and fortified by the Italians on the 20th of January, lies halfway between Tripoli and Zanzur; Sidi Abd-el-Gilil is a tomb about 1,200 yards from the edge of the Zanzur oasis, near the point where the coast caravan road from Tunis bifurcates to Aziziah and Gharian. The country between Gargaresch and the Turco-Arab position consists of undulating desert.

The following narrative of the operations is from the Italian official telegrams, and from narratives in the Italian Press:—At 3.30 a.m. Lieut.-General Camerana's division marched out from Gargaresch in two columns. The first column consisted of—Major-General Giardina's brigade, 6th and 40th Regiments; one company Customs Guards; two mountain batteries. The second column consisted of—Major-General Rainaldi's brigade, 82nd and 84th Regiments; three field batteries. A battalion of Askaris, a cavalry brigade, and a mountain battery were held in reserve near No. 3 Redoubt at Gargaresch. The first column marched along the coast, and the second column along the Tripoli—Zanzur caravan road. At 5 a.m. the first column came upon the enemy, who were strongly entrenched at Sidi Abd-el-Gilil. Under cover of artillery fire, the position was attacked with the bayonet, and at 7.50 a.m. it was taken.

Meanwhile the second column attacked on the left, and also charged with the bayonet. Some of the 6th Infantry from the 1st column to[o] part in this attack.

While this fight was proceeding, at 7.30 a.m., a Turco-A[rab] from the south made a determined counter-attack on Gargar[esch] the left of General Camerana's division.

The cavalry brigade, a battalion of the 37th Infa[ntry] battalion, a mountain artillery battery from the r[ear] battery and a field battery from Gargaresch m[et] counter-attack, and Major-General Montuor[i] Regiments), from Bu-Meliana attacked th[e]

By 12 noon the Turco-Arabs were [re]brigade attacked again, whereupon

At 4 p.m., the Turco-Ar[abs] were driven back by the cav[alry]

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and at 5 p.m. the fighting ceased. General Giardina remained in his position, which dominates the oasis of Zanzur, and the rest of the troops returned to their camps.

The Italian losses were one officer, 19 soldiers, and ten Askaris killed; eight officers, 182 soldiers, and 70 Askaris wounded. The Turco-Arabs are said to have lost over 1,000 men killed.

It is not clear whether the Italians have been able to proceed to the occupation of Zanzur itself, but the victory has been received in Italy with great enthusiasm, the more so as the recent inaction in Tripoli had caused a feeling of annoyance and irritation, especially when the Fabian methods of General Caneva were compared with the successes gained by General d'Ameglio in the Aegean.

Homs.—(See map on page 838 of June JOURNAL). At 4 a.m., a violent attack was made by the Turco-Arabs on the Italians who occupied the hills above Lebda. It is said that one fort with a garrison of some 40 of the 89th Regiment was captured. At 8.15 a.m., General Reisoli counter-attacked with every available man from Homs on the hostile flank and rear. The encounter was very sharp; the Italians losing two officers and 29 men killed, and two officers and 57 men wounded. Four hundred and twenty-one Turco-Arab corpses are said to have been found. The bulk of the fighting appears to have been carried out by the 8th Bersaglieri and the 89th Infantry. According to Turkish accounts, two Italian forts were stormed, two heavy guns and quantities of small arms were seized, and heavy losses were inflicted on the Italians; retirement had eventually to be made, after burning masses of stores, on account of fire from the ships and the other forts.

LANDING AT BUSCEIFA.—On the 16th June, the Italians landed a fresh expeditionary force at Busceifa, a place about 60 miles east of Tripoli, and eight miles from Misurata. The latter place is an important commercial centre with 15,000 inhabitants, situated about six miles from the coast. This expedition had been contemplated for some time, and transports had been waiting at Naples since May 15th.

Reliable details of the troops disembarked have not yet been published.

The official report runs as follows:—

"An expeditionary corps, under General Camerana, escorted by the ships of Admiral Borea Ricci's division, appeared last night before Misurata. In a wireless message from the "Re Umberto," the Admiral ays that General Fara, with a force of blue-jackets and a detachment of ops, landed and occupied a height to the south of Busceifa. At the ime the guns of the "Re Umberto" put to flight bodies of Arabs pted to oppose the disembarkation. At six o'clock the *marabout* vas occupied. In the meantime the landing of troops and ntinued in good order."

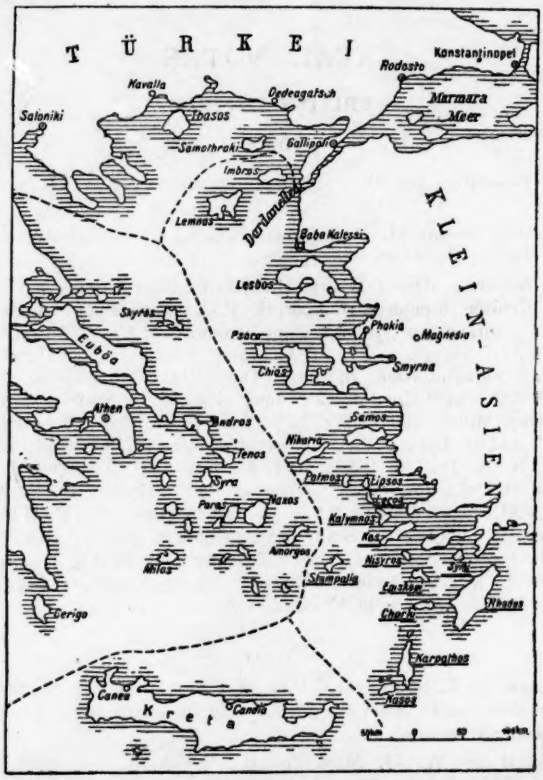
May 12th, at Tobruk, the 30th Regiment (three batin battery, who were covering a working party, of Turco-Arabs in the neighbourhood. mediately, and drove off the Turco-Arabs, killed.

egean.

d, stated that all the public revailed.

Cos and Simi were occupied by the Italian fleet on the 19th and 20th May respectively.

ITALIAN CONQUESTS IN THE AEGEAN.



The Islands Occupied by the Italians are Underlined.

[Reduced from a map in *Streffleur's Militärische Z*

According to the *Kölnische Zeitung* the island of Co
garrison of 500 men; the smaller Aegean islands have
Italian officer or N.C.O., and 15 men each, while loc
organized for police purposes under Carabinieri i
trative centre is at Stampalia, but the island
consists chiefly of Greeks, are practically
included in this system, but is directly
The troops in the Aegean were re
infantry regiment (42nd) from It

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NAVAL NOTES.

BRITISH EMPIRE.

HOME.

The following are the principal appointments which have been made :—

Vice-Admiral—Sir H. B. Jackson, K.C.B., to be Vice-Admiral Commanding the 7th Squadron temporarily.

Rear-Admirals—David Beatty, C.B., to be Rear-Admiral Commanding the 6th Cruiser Squadron temporarily; C. Dundas of Dundas to be Second in Command of 7th Squadron temporarily; C. V. Anson, M.V.O., to be Admiral Superintendent of Chatham Dockyard; S. H. Carden to be Admiral Superintendent of Malta Dockyard. Captains—R. F. Phillimore, M.V.O., to " Good Hope," and as Chief of Staff to Admiral Sir A. Berkeley Milne, Bart., K.C.B.; Hon. H. E. H. A'Court to " St. Vincent," and as flag-captain on recommissioning; C. C. Fowler to " Roxburgh "; A. A. Duff to " Lion," J. C. Ley to " Collingwood," W. S. Nicholson to " Exmouth," R. Webb to " Illustrious," A. E. M. Chatfield, C.V.O., to " Aboukir," all as flag-captains; E. M. Philpotts to " Thunderer," as Chief of Staff to Vice-Admiral Prince Louis of Battenberg; H. F. Oliver, M.V.O., to " Thunderer "; E. La T. Leatham to " Gloucester "; H. A. Adam to " Prince George," and as flag-captain to Rear-Admiral C. Dundas of Dundas.

General.

Admiral Sir E. S. Poë, G.C.V.O., K.C.B., lately Commander-in-Chief of the Mediterranean Fleet, struck his flag on board the " Exmouth " at Portsmouth on the 29th ult.

Admiral Sir W. H. May, G.C.B., G.C.V.O., has been appointed Umpire-in-Chief and has hoisted his flag in the " Euryalus."

[illegible]ops, Admiral (Acting) H.S.H. Prince Louis of Battenberg, G.C.B., etc., [illegible]me's flag on board the " Thunderer " at Devonport on the 3rd inst., [illegible]pte[illegible]iral Sir H. B. Jackson, K.C.B., and Rear-Admiral C. Dundas [illegible]was d their flags on the 2nd inst., on board the " Illustrious " [illegible]ntinc," respectively, at Devonport, as Vice-Admiral Com-[illegible]May [illegible]Command of the 7th Squadron.

[illegible]in ba Sir Stanley C. J. Colville, K.C.B., C.V.O., [illegible]of [illegible]f the 1st Battle Squadron in the " Colling-[illegible]amed.

[illegible] killed [illegible]attleship " Delhi " was laid on the [illegible]ow-in-Furness.

[illegible]egean.

[illegible]d, [illegible]ed at Chatham on the 4th [illegible]grev[illegible] which is thus brought [illegible]e " Formidable " class.

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The new battle-cruiser "Lion," having completed her trials satisfactorily, commissioned on the 4th ult., at Devonport, and she has taken the place of the "Inflexible," as flagship of Rear-Admiral L. Bayly, commanding the 1st Cruiser Squadron.

During the gunlayers' tests at Lamlash, the battleship "Collingwood," of the 1st Battle Squadron, scored with one of her 12-inch guns eight hits in eight rounds in two minutes, thus establishing a record, and beating the "Orion," which had scored eight hits in eight rounds in two minutes eight seconds.

Withdrawal of the Mediterranean Fleet.

The battleships of the Mediterranean Fleet have been withdrawn from Malta, and are in future, in accordance with present arrangements, to be based on Gibraltar. In the meantime, the ships, consisting of the "Exmouth" (flag), "Duncan" (flag of Rear-Admiral), "Cornwallis," and "Russell," have returned to England, and will take part in the manœuvres.

The Armoured Ships of 1911-12.

In reply to a question in Parliament, the First Lord of the Admiralty has stated that the new battleships "Benbow" and "Delhi" were laid down on May 30th and May 31st, respectively. Their contract date for delivery is February 4th, 1914. The battle cruiser "Tiger" was to have been laid down during the latter part of last month, her contract date for delivery being March 31st, 1914. These three ships are being built by contract, the "Delhi" by Messrs. Vickers, Barrow-in-Furness; the "Benbow" by Messrs. Beardmore, Glasgow, and the "Tiger" by John Brown & Co., Glasgow.

The two dockyard-built ships of the programme were laid down, the "Iron Duke" on January 15th last, at Portsmouth, and the "Marlborough" on January 25th at Devonport; it is intended to launch the former in October and the latter in October or November.

Steam Trials of the "Conqueror."

The new battleship "Conqueror," built and engined by Messrs. William Beardmore & Co. (Limited), at Dalmuir, has completed all her steaming trials. Her machinery is of the Parsons turbine type, working four shafts, and the boilers (18 in number) are of the Babcock and Wilcox type. The *Times* gives the following account of the trials.

The results of the trials were satisfactory. The requirement of the contract was that the vessel on an eight-hours' full-power trial should maintain a mean horse-power of 27,000 s.h.p., but under especially easy steaming conditions a steam pressure of 230 lbs. was maintained, and the average horse-power for the whole time worked out at 28,400 s.h.p. During the trial six runs were made over the measured mile at Polperro. The performance of the ship on these runs was remarkable for two reasons. First there was a variation in speed of only .04 knots, the speed of three consecutive runs being the same—namely, 23.133 knots, while the lowest speed, that on the first run, was 22.026 knots. Secondly the "true mean" speed, 22.13 knots, is the best performance of any ship of the class to which the "Conqueror" belongs, and is more favourable than the rate realized by any foreign ship in corresponding severe conditions as those exacted by

the British Admiralty. The vessel was loaded to her full service draft, and there were no difficulties in the stokehold in maintaining the power. The coal consumption showed a high economy.

Evidence was afforded when the vessel was at sea that the designed power could be exceeded. On an extended run of more than an hour's duration, the mean was found to be considerably in excess of the guaranteed rate, so that the vessel has a reserve of steaming capacity. The other trial of the ship included a 30-hours' run at what is considered the continuous sea-steaming speed. On this trial the mean power developed was over 19,000 s.h.p., with the turbines making 286 revolutions per minute. The speed of the ship was about 19½ knots. Again, the economy of fuel was a pronounced feature of the performance.

Launch.

The third-class cruiser "Fearless" was launched on the 12th ult. from Pembroke Dockyard. She is the seventh and last vessel of the "Boadicea" class of fast unarmoured cruisers which have been built primarily to act as parent ships to destroyers. Her dimensions are as follows:—Length, 385 feet; beam, 41 feet 6 inches; displacement, 3,440 tons, with a mean load draught of 13 feet 9 inches. Her turbine engines are to develop 18,000 I.S.P., to give a speed of 25 knots, steam being provided by Yarrow boilers.

The "Boadicea," the original ship of the class, was authorized in 1907, and provision has been made for one or two similar vessels in each naval programme down to that of the present financial year. The construction of vessels of this type is now, however, to be discontinued, and a new class of light armoured cruiser is to be built instead. According to the First Lord, in his speech, when introducing the Navy Estimates, these new cruisers are to be the smallest, cheapest and fastest vessels, protected by vertical armour, ever projected for the British Navy. They are meant to attend on the battle fleet, to be its eyes and ears by night and day, and will be strong enough to overhaul and cut down any torpedo-destroyer afloat.

The Naval Manœuvres.

The ships taking part in the manœuvres assembled at Spithead on the 5th-8th inst., and on Tuesday, 9th inst., were inspected by members of both Houses of Parliament. There were two fleets engaged; the Red, under the command of Acting-Admiral Sir G. Callaghan, G.C.V.O., K.C.B., was the attacking fleet, while the Blue, under the command of Acting-Admiral H.S.H. Prince Louis of Battenberg, G.C.B., G.C.V.O., was the defending one. The following squadrons formed the two fleets:—The 1st, 2nd, 3rd, 4th, 5th and 7th Battle Squadrons, with the 1st, 2nd, 3rd, 5th and 6th Cruiser Squadrons, the Training Squadron and Patrol Flotillas. The 4th Battle Squadron was formed of the battleships lately withdrawn from the Mediterranean, and Vice-Admiral (Acting) Briggs, who was in command, hoisted his flag in the "Exmouth," lately the flagship of Admiral Sir E. S. Poë in the Mediterranean.

Result of Gunlayers' Test, 1911.

Their Lordships make no remarks as to the standard of shooting attained, simply notifying that the award of the medal will be promulgated in due course.

The abstract of the firing for 1911, which is given on the third page of the Return, shows the East India Squadron first in order of merit, with the "Highflyer" as the best ship of the squadron. The second place in the list is taken by the China Squadron with the "Minotaur" as the best ship and as the ship with the highest score, viz., 86.02 points. The third place in order of merit is taken by the Atlantic Fleet and Fifth Cruiser Squadron, with the "Duke of Edinburgh" as best ship. The other fleets or squadrons stand as follows:—Mediterranean Fleet and Sixth Cruiser Squadron, with the "Russell" as first ship; Home Fleet, Second Division, and Second Cruiser Squadron; Home Fleet, Third Division, and cruisers; Australia; Fourth Cruiser Squadron; Home Fleet, First Division, and First Cruiser Squadron, Special Service Tenders, and Cape of Good Hope.

In the table which gives the firing by the different descriptions of guns the "Formidable" stands first in order of merit with the 12-inch gun; the "Exmouth" comes next, and the "Collingwood" third; the first-named ship belonged to the Atlantic Fleet, the second to the Mediterranean, and the third to the First Division, Home Fleet. The table, which gives the fleet classified in order of merit of ships competing, places the "Encounter" first ship with a score of 446.0 points; the "Formidable" second with a score of 331.7, and the "Exmouth" third with 296.7. The best shots in these ships in the order named being, C. Denial, Private R.M.L.I.; F. Stevens, 1st Class P.O., and H. Dovey, L.S.; J. Thundercliffe, 1st Class P.O., and B. Clarke, gunner R.M.A.

ABSTRACT, 1911.

Order of Merit.	Fleet or Squadron.	No. of Ships.	No. of Men Firing	Points per Gun or Turret	First Ship in Fleet.	Score.
1	East Indies	1	11	78·43	*Highflyer* ...	78·43
2	China	6	70	69·715	**Minotaur** ..	86·02
3	Atlantic Fleet and Fifth Cruiser Squadron	13	190	48·339	*Duke of Edinburgh*	57·85
4	Mediterranean Fleet and Sixth Cruiser Squadron	14	186	47·639	*Russell*	70·36
5	Home Fleet, 2nd Division and Second Cruiser Squadron	14	176	44·479	*Natal*	66·27
6	Home Fleet, 3rd Division and Cruisers	34	411	43·852	*Sapphire*... ..	64·79
7	Australia	8	79	41·328	*Powerful* ...	66·82
8	Fourth Cruiser Squadron	7	82	37·960	*Brilliant*... ...	64·61
9	Home Fleet, 1st Division and First Cruiser Squadron	13	126	35·383	*Blanche*	46·85
10	Special Service Tenders	14	69	32·140	*Cadmus*	56·85
11	Cape of Good Hope ...	3	29	28·390	*Hermes*	45·69
	Total, 1911 Test ...	127	1,429	43·297		
	Total, 1910 Test ...	117	1,318	42·649		
	Difference	+10	+111	+·648		

NOTE. — The 4-inch guns of H.M.S. *Bellerophon* and *Invincible* classes are not included in this abstract.

Altogether 127 ships, with 1,429 men took part in the test, with an average of 43.297 points per gun.

—	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.
Number of ships that fired ...	139	134	108	100	89	121	117	116	117	127
Number of guns or turrets ...	1,241	1,296	1,171	1,096	1,073	1,365	1,277	1,312	1,318	1,496
Number of hits .. 1906 target	4,789	5,996	5,748	4,734	5,733	7,547				
Number of hits .. 1907 "						4,073	4,826	5,108	3,520	3,944
Number of hits .. Ricochet									436	570
Number of misses 1906 target	6,863	7,028	7,664	3,357	23·28	1,991				
Number of misses 1907 "						5,465	4,183	4,330	3,253	3,714
Excess of hits over misses... ... 1906 "	Nil	Nil	N 1	1,017	3,405	5,556				
Excess of hits over misses... ... 1907 "						Nil	643	778	703	800*
Excess of misses over hits ... 1906 "	2,074	1,032	1,916	Nil	Nil	Nil				
Excess of misses over hits ... 1907 "						1,392	Nil	Nil	Nil	Nil
Percentage of hits to rounds fired 1906 "	41·1	46·04	42·86	56·58	71·12	79·13				
Percentage of hits to rounds fired 1907 "						42 70	53·57	54·12	51·85	50·01 †
Hits per gun per minute :—										
12 inch and 10-inch ... 1906 target	·38	·53	·47	·58	·81	·61				
12 inch and 10-inch ... 1907 "						·40	·56	·63	·70	·58‡
9·2-inch ... 1906 "	·35	·70	·73	1·40	2·84	3·25				
9·2-inch ... 1907 "						2·01	2·20	1·94	2·01	1·90‡
7·5-inch ... 1906 "						3·48				
7·5-inch ... 1907 "						1·58	2·51	2·47	2·61	2·78‡
6-inch B.L. and Q.F.... ... 1906 "	2·41	2·63	2·63	4·14	5·68	5·93				
6-inch B.L. and Q.F.... ... 1907 "						3 32	3·98	4 03	3·69	3·89‡
4·7-inch Q.F. and 4-inch B.L. and Q.F. 1906 "	2·02	2·47	2·28	3·73	4·96	5·73				
4·7-inch Q.F. and 4-inch B.L. and Q.F. 1907 "						2·38	3 32	4 06	3·84	3·91‡
Number of ships from whom no returns were received.	19	30	43	Nil	Nil	3	8	10	12	19

* Counting ricochet as whole hits. †The figures for 1911, counting ricochets as whole hits, would be 54·86. ‡ Ricochet hits counting $\frac{3}{10}$th hit. Results not directly comparable with those obtained in 1910.

FRANCE.

The following are the principal appointments which have been made :—

Capitaines de Vaisseau—L. E. Sagot-Duvaurouse to " Diderot "; M. F. Grasset to " Jeanne-d'Arc "; A. C. Biard to " Gaulois "; V. M. Rageot de la Touche to " Bouvet "; C. V. C. Ollivier to " Verité "; L. A. Mottez to " Suffren "; L. M. Laporte to " Vergniaud "; L. A. Viard to " Marseillaise "; H. J. Durand to " Jules-Ferry."

Loss of the Submarine " Vendémiaire."

A serious loss has been sustained by the French Navy through the sinking of the submarine " Vendémiaire," which was run down by the battleship "Saint-Louis," flagship of Vice-Admiral De Marolles, Commanding the Third Squadron, on the morning of June 8th, some five miles off Cap de la Hague, two officers and 23 men, who formed the crew, being drowned.

The collision took place in fine weather about 6.15 a.m. In accordance with the programme the Cherbourg Submarine Flotilla, of which the " Vendémiaire " was one, left the harbour at 5 a.m. to carry out a series of attacks against the Third Squadron, which was steaming in column of

line ahead with the " Saint-Louis " leading. When the squadron was some five miles north-west of Cap de la Hague, the men on the look-out in the " Saint-Louis " suddenly saw the periscope of a submarine emerge immediately ahead of the ship, and before the course could be altered she ran into the submerged craft. A slight shock was felt, and for some minutes a quantity of air bubbles appeared on the surface, followed by patches of oil and some fragments of the flying deck, belonging, as was afterwards ascertained, to the " Vendémiaire." The vessel sank in 26 fathoms, and buoys were immediately moored to mark where she had gone down, but they were carried away by the strong currents which always run there.

The " Vendémiaire " is a sister vessel to the " Pluviôse," which was run down on May 26th, 1910, off Calais by one of the cross-Channel steamers; on that occasion 27 lives were lost. The " Vendémiaire " was one of a class designed by M. Laubeuf, which have a displacement of 398 tons, and a length of 160 feet, with a speed of 12 knots on the surface and seven when submerged.

Previous Submarine Losses.

The following are the submarine losses which have occurred in the British and other navies:—

1904.— " A 1 " (British) sunk by collision with the steamer " Berwick Castle " off the Nab lightship, March 18th. Eleven drowned.

1904.—" Delphin " (Russian) sunk off Kronstadt, June 29th, by wash of a passing steamer. Twenty-one drowned.

1905.—" A 8 " (British) sunk in Plymouth Sound, June 8th. Fifteen drowned.

1909.—" Foca " (Italian) sunk by explosion, April 26th, in the Bay of Naples. Eight lives lost.

1909.—" Kambala " (Russian) rammed by a battleship during manœuvres, June 12th. Twenty drowned.

1909.—" C 11 " (British) sunk by collision with the steamer " Eddystone " off Cromer, July 14th. Thirteen drowned.

1910.—" No. 6 " (Japanese) foundered in Hiroshima Bay, April 15th. All crew drowned.

1911.—" U 3 " (German) sunk off Kiel, January 17th. Three lives lost.

1912.—" A 3 " (British) sunk by collision with the gunboat "Hazard," off the Isle of Wight, February 2nd. Fourteen lives lost.

JAPAN.

Naval Estimates, 1912-13.

The Ordinary Budget amounts to £4,166,604, being an increase of £7,080 over the Estimates for last year; the Extraordinary Budget amounts to £5,295,213, showing an increase of £592,908, the total Naval Budget thus amounting to £9,461,817. The principal items are as follows:—

Admiralty, £19,824; pay and allowances, £1,289,633, an increase of £46,845; clothing and provisions, £695,329, a decrease of £33,622; shipbuilding, armaments, and repairs (exclusive of new construction), £1,167,784, a decrease of £224; manœuvres, £30,020, an increase of £749; maintenance of ships, dockyards, etc., £624,778, an increase of £2,932; hydrographic service, £24,776, a decrease of £2,610; Chinkai

naval station, £71,458, 3rd instalment; armaments replenishing fund, £5,086,014, an increase of £623,728.

Programme of New Construction.

The revised programme of construction since the conclusion of the war provided for the building of eight battleships, of which six (the "Katori," "Kashima," "Aki," "Satsuma," "Kawachi," and "Settsu") have been built or are completing; nine armoured or battle-cruisers (the "Ibuki," "Tsukuki," "Ikoma," "Kurama," "Kongo," and four others) yet to be built; five protected cruisers, of which one, the "Tone," has been built, and some despatch vessels and torpedo craft. This left two battleships and four other battle-cruisers to be built, but a difficulty in proceeding with the programme arose owing to the bad financial condition of the country.

At a Cabinet meeting held at the end of last year, a compromise was arrived at, which would appear to have been much more to the mind of the Minister of Finance than that of the Minister of Marine. A scheme of construction covering the years up to 1920 was brought forward, involving an outlay not far short of £40,000,000; but it was decided to authorize an outlay of only £9,000,000 for 1912-17, making provision for the building of one battleship and three battle-cruisers, and in view of the state of the exchequer, to lay the chief part of the expenditure on the years 1915-16. The distribution of expenditure is to be as follows:—1912, £250,000; 1913 and 1914, £1,000,000 each; 1915, £2,000,000; 1916, £4,500,000; 1917, £500,000. It is stated that the Minister of Marine is far from being content, and that had he had his way, the minimum programme to be commenced and completed between 1913-1920 would have been eight battleships and eight battle-cruisers, as well as sixteen small cruisers, at a cost of over £35,000,000.

New Ships.

The new battle-cruiser "Kongo" was launched on the 18th May from the naval construction works of Messrs. Vickers, at Barrow-in-Furness. Her dimensions are as follows:—Length, 704 feet; beam, 92 feet; displacement, 27,500 tons, with a draught of 27 feet 6 inches. She is one of four sister-ships, of which the other three are being built in Japan; the "Hiyei" at the Imperial dockyard, Yokosaka; the "Kirishima" at the Mitsubishi yard, Nagasaki; and the "Haruma" at the Kawasaki works, Kobe.

The "Kongo" is the heaviest battle-cruiser yet built, and the *Times* gives some interesting details about her. Her main armament consists of eight 14-inch guns, mounted in four barbettes along the middle line of the ship, two of these being forward of the funnels and two aft of them. The bow and after barbettes are lower than the two immediately abaft and before them, thus enabling the latter to fire over them, so that four guns can be fired ahead and four astern, while all can be fired on either broadside. As secondary armament, the ship carries sixteen 6-inch guns, eight on each side in a casemate on the upper deck, and sixteen smaller Q.F. guns, with five submerged torpedo-tubes. Protection is afforded by a 10-inch water-line belt, extending some feet below the surface, and below that again is a thinner belt; the main belt is carried to the height of the boat deck, which is continued on the same level as

the forecastle, forming the citadel for the 6-inch guns. There are two armoured decks.

The turbine engines are expected to develop 70,000 I.S.P., giving a speed of 28 knots; the four three-bladed propellers are of manganese bronze. There are two independent sets of engines, separated by a careful longitudinal bulkhead. Each set comprises a high-pressure and a low-pressure turbine, the former driving the outer shaft and the latter the inner one in each case, and on each shaft, aft of the ahead turbine and in the same casing, there is an astern turbine—high pressure on the outer shafts and low pressure on the inner—so that all four screws can be used for reversing. The high-pressure turbines, both ahead and astern, are of the Parsons combined impulse and reaction type, while the low-pressure ones are of the reaction type. Steam is supplied to the turbines at a pressure of 205 lbs. per square inch, from 36 water-tube boilers of the Yarrow large-tube pattern, placed in eight separate compartments, four on each side of a longitudinal bulkhead. Arrangements are made for burning both coal and oil; there is coal stowage for 4,000 tons, and for 1,000 tons of oil.

The new battleship "Fuso" is to be laid down at the Imperial dockyard at Kure; it is stated that she will have a displacement of 30,000 tons, and that she will be armed with 15-inch guns.

Three protected cruisers have lately been launched, the "Hirado," "Shikuma," and "Yahagi." Their dimensions are as follows:—Length, 475 feet; beam, 46 feet 6 inches; displacement, 4,800 tons, with a draught of 16 feet 9 inches. The turbine engines are to develop 22,500 I.S.P., to give a speed of 26 knots; and the armament will consist of six 6-inch and four 3-inch Q.F. guns.

PORTUGAL.

THE NEW NAVY.—The new naval fleet will consist of:—

(*a*) Three 20,000-ton battleships. Armament, eight 13.5-in. guns and eight 2.5-in. guns.
(*b*) Three scouts (3,500 tons). Armament, four 4.7-in. guns, four 2.5-in. guns, two torpedo tubes, H.P. 22,000.
(*c*) Twelve torpedo destroyers (820 tons). Armament, four 2.5-in. guns, two torpedo tubes, H.P. 16,000.
(*d*) Six submarines (360 tons). Armament, four torpedo tubes.
(*e*) Three torpedo destroyers—type not yet settled, to be built in Portuguese dockyards.

The total Naval Budget will be £7,924,000. The expense of this fleet will be a very considerable charge on the Portuguese Treasury, but it is considered necessary on account of the great colonial empire of Portugal.

RUSSIA.

THE NEW NAVY BILL.—During the last three or four years a few modern warships have been building on the Neva and in the Black Sea; but a more comprehensive scheme of naval construction which has been shelved for the last two years, has now been brought forward by the presentation to the Duma of the Modified Navy Bill. In the modified Navy Bill, the Government demanded nearly £53,000,000 for a special five-year programme, which includes shipbuilding (in addition to the four new battleships, which are approaching completion in the Neva) and harbour improvements.

When the Bill was before the Budget Committee of the Duma on the 7th and 8th June, M. Kokovtsov, the Premier, declared that the budgetary resources were fully equal to bearing the proposed burden without prejudice to the promotion of social reform.

The preamble to the Bill states that, in addition to the £53,000,000 now demanded for the special programme, about £82,000,000 will have to be expended during the next five years on the completion of ships already building and on current naval expenditure.

The Bill was passed by the Duma on the 19th June by a majority of 288 to 71, with the following amendments:—the £7,500,000 for harbours was removed from the Bill to be dealt with separately, and the actual expenditure of the £53,000,000 is to be spread over a period of five years, with an annual average expenditure of about £10,500,000, application being made to the Duma for each annual instalment as a separate grant.

UNITED STATES.

Launch of the "Texas."

The battleship "Texas" was launched on May 18th from the Newport News yard. When completed, the ship will be the largest and most powerful ship afloat; ready for sea with all her stores on board she will have a displacement of 28,367 tons. She will be the first vessel to carry 14-inch guns, of which she will have ten, and will be unique also in that she will carry five-inch Q.F. guns in place of the three- and four-inch, which, as a rule, equip the secondary batteries.

The dimensions and general characteristics of the "Texas" are :—Length over all, 573 feet; extreme beam, 95.2 feet; draught on trial, 25.6 feet; trial displacement, 27,000 tons; full load displacement, 30,000 tons; coal bunkers capacity, 3,500 tons; cruising radius, 8,000 miles; I.H.P., 30,000; speed on trials, 21 knots.

In addition to her 14-inch guns, the "Texas" will carry 21 five-inch Q.F. guns for the secondary battery. The turrets for the 14-inch guns are to be electrically controlled. The guns are so disposed as to make it possible to fire all ten on either side, thus giving the ship the most powerful broadside fire of any warship afloat. Two of the turrets containing the 14-inch guns will be placed forward of the superstructure, and the other three will be aft of the funnels. With this arrangement all the guns in the forward turrets can be fired right ahead, and those of the after turrets right astern. To make this possible one turret fore and aft is raised to fire over the other.

Of the secondary battery of 21 five-inch Q.F. guns, two will be placed on the superstructure above the main deck and the remaining 19 on the gun deck below. There will be nine on each broadside and one at the stern. In addition to the guns and the two field-guns for landing, the "Texas" will be equipped with two submerged torpedo-tubes, one on the starboard and one on the port side. The ship will have a freeboard forward of about 30 feet, and is so designed that when running in a rough sea the waves will not break over her bow and interfere with the work of firing the guns in the forward turrets.

In defensive construction the "Texas" also will be unsurpassed by any vessel afloat. On the water line, extending from a point about 100 feet from the bow and running back to the stern, will be a belt of armour eight feet wide and 11 inches thick above water and nine inches below water, covering the centre portion of the ship to protect the boilers

and machinery. The armour belt tapers to a thickness of six inches at the stern, and along the water line will extend about six feet below the full-load line, so as to afford protection when the ship is rolling and the bottom exposed.

Above the water line armour belt will be two other belts, having a maximum thickness of 11 inches amidships and tapering to nine inches at each end. These belts will be 400 feet long and will afford protection for the secondary battery, the funnels below the main deck and the hospital. The armour on the sides and back of the turrets will be nine inches thick, and that on the front 14 inches thick; the covering hoods for the turrets will be five inches thick. The conning tower will be protected by 12-inch armour.

All of that part of the hull of the ship forward of the forward armoured bulkhead and all that part of the ship aft of the armoured bulkhead down to the protective deck, it is calculated, could be shot away and the ship be able to continue to float and fight. Beneath the protective deck of the "Texas" are three distinct hulls, and in order to sink the ship a torpedo would have to pierce all three, and amidships would also have to pierce the coal bunkers.

The "Texas" will be propelled by twin screws, driven by two reciprocating engines of a combined I.H.P. of 30,000. She will have a complement of 63 officers and 1,000 men, and it is expected will be ready to be handed over to the Government in May, 1913.

Army and Navy Journal.

NAVAL AND MILITARY CALENDAR.

JUNE, 1912.

3rd	(Mon.)	Birthday of His Majesty the King (1865).
4th	(Tues.)	H.M.S. "Lion" commissioned at Devonport.
8th	(Sat.)	French submarine "Vendémiaire" sunk by collision with battleship "Saint Louis" off Cap de la Hague, with a loss of 25 lives.
"	"	Review of London Division of the National Reserve by the King in Hyde Park.
"	"	Italians attack the Turco-Arab position near Zanzur.
10th	(Mon.)	Lord Haldane succeeded as Secretary for War by the Rt. Hon. Lieut.-Colonel J. E. B. Seely, D.S.O., M.P.
12th	(Wed.)	Launch of 3rd-class cruiser "Fearless" at Pembroke Dockyard.
14th	(Fri.)	Official celebration of the King's birthday.
15th	(Sat.)	Departure of the battleships from Malta.
16th	(Sun.)	Landing of Italian force at Busceifa, near Misurata.
18th	(Tues.)	Centenary of the Declaration of War between the United States and Great Britain (1812).
20th	(Thurs.)	Passing of the Bill for the expansion of the Russian Navy.
23rd	(Sun.)	Eighteenth Birthday of H.R.H. The Prince of Wales.
24th	(Mon.)	Death of Field Marshal Sir G. S. White, V.C., G.C.B., etc.
27th	(Thurs.)	H.M.S. "Exmouth" arrived at Portsmouth from Mediterranean.
28th	(Fri.)	Victory of the Italians over the Turco-Arabs at Sidi Said, near the Tunisian frontier.

MILITARY NOTES.

BRITISH EMPIRE.

Home.

REVIEW OF THE NATIONAL RESERVE.—On the evening of Saturday, June 18th, the King and Queen reviewed the London Division of the National Reserve. Thirty-five battalions took part in the ceremony and the number of men on parade was 17,000; the whole under command of Field Marshal Sir Evelyn Wood, V.C., Commandant of the London Division. The arrangements for assembling these units in Hyde Park had been carefully and completely worked out, and maps had been issued showing the place of rendezvous, as well as the route to the parade ground for every unit. As a result the concentration was carried out with perfect smoothness.

Civilian dress was worn by the men, with National Reserve badges and medals outside the coats; no sticks or umbrellas were carried in the ranks; smoking was not allowed till after the King's departure.

By 5.30 p.m. the seven brigades of the Division had been formed up in Hyde Park, south-west of Marble Arch, in two lines of battalions in quarter column facing east. At 6 p.m. the King and Queen arrived from Hyde Park Gate and were received with a royal salute. After carefully inspecting the Division and a detachment of Crimean and Mutiny veterans, who were formed up in front of the centre of the line, the King witnessed the march past of a representative company from each battalion. The line then advanced in review order with remarkable steadiness and the parade concluded with cheers for their Majesties. The men dispersed in the park on the conclusion of the ceremony.

The following communiqué was issued from the War Office by the King's command:—

"It was a great pleasure to the King to have an opportunity of reviewing the London Division of the National Reserve on Saturday afternoon. His Majesty was much impressed with the evidence of reserve military strength in the London district which this parade has afforded.

"The King desires to express his satisfaction with the general physical appearance and bearing of the men and his appreciation of the spirit with which they and the officers have identified themselves with the movement. At the same time His Majesty recognises how much is due to the generous friends and to the employers of the men who made it possible to organize the review, and to those by whom the arrangements were so successfully carried out."

Cyprus.

BRITISH REINFORCEMENTS.—Owing to serious rioting having broken out at the end of May in the town of Limassol, between the Mussulmans and the Greeks, the British garrison in the island was ordered to despatch assistance to the police. Before the troops arrived, however, the police were forced to fire on the rioters, killing four and wounding about 100. A reinforcement, consisting of one company of the Devonshire Regiment, was despatched to Cyprus from Alexandria.

India.

ABOR EXPEDITION.—The official despatches of the Abor Expedition, and the comments of the Government of India on the operations, were published in the *Gazette of India*, dated 25th May, 1912.

ARMS TRAFFIC IN THE PERSIAN GULF.—It is stated in the Press that the Sultan of Masquat has issued a notification, dated 4th June, providing for the proper regulation of the trade in arms and ammunition within his dominions. The notification has evoked comment in the French Press.

Afghanistan.

THE RISING IN KHOST.—According to the Press, the rebellion in Khost is subsiding, in consequence of the recall of the Afghan Governor. But a small portion of the Afghan punitive force reached the borders of Khost, and in what little fighting took place the rebel tribesmen appear to have more than held their own. It appears unlikely that the prestige of the Afghan Government has been enhanced by their handling of this rising.

South Africa.

DEFENCE BILL.—The Union Defence Bill, as amended by the Select Committee, passed its third reading on 6th May. General Smuts, Minister of Defence, said that the amended scheme would cost half a million sterling annually. The Governor-General has since given his assent to the Act, which will come into force on January 1st, 1913. It is officially announced that the Council of Defence, constituted under the provisions of the Defence Bill, will be composed of General Schalk Burger, Colonel Crewe, General De Wet, and Colonel Sir Duncan Mackenzie. (*Reuter*).

ARGENTINA.

ELECTIONS.—All employés of the War and other Government Departments were ordered to exercise their voting power at the recent general election. The elections passed off quietly, and were the first free elections that have taken place in Argentina. They resulted in a majority for the Radical Party.

PEACE ESTABLISHMENTS.—The peace establishments of the standing army and its departments have been published, and show that 15,540 conscripts are required in 1912, a decrease of about 3,000 as compared with 1911.

STAFF COLLEGE.—Thirteen officers of all arms have been admitted to the Staff College by competitive examination. Eleven officers also passed but were not admitted owing to want of vacancies.

AUSTRIA-HUNGARY.

The health of His Majesty the Emperor continues to be remarkably good, and he has resumed his usual gallop in the early mornings. His Majesty completes his 82nd year in August next.

King Ferdinand of Bulgaria, accompanied by Queen Eleonora and his two sons, paid an official visit to the Emperor on June 1st. The meeting is reported to have been very cordial.

The visit of King Ferdinand was followed within a few days by one from King Nicholas of Montenegro. King Nicholas was received with the same honours as those paid to the Sovereigns of the Great Powers.

The Emperor, after meeting his Majesty at the railway station, entertained him at a gala luncheon, and bestowed upon him the honorary colonelcy of the 55th Infantry Regiment.

CROATIA.—Martial law still prevails in Croatia, and it is reported in the Press that the present "Ban," Dr. Cuvaj, is to be replaced by a military commissioner, probably the General commanding the Agram Army Corps.

BOSNIA-HERZEGOVINA.—General Potiorek, commander of the Sarajevo Army Corps, and head of the Bosnian Government, has been entrusted with the chief civil powers also, the civil administration being henceforward subordinated to him.

These powers were formerly possessed by a civil "Adlatus," who, though nominally subordinate to the military governor, had the right of direct correspondence with Vienna. The post of "Adlatus" has now been abolished.

ARMY BILL.—The Army Bill has, after vigorous obstruction, been successfully passed through the Austrian Parliament.

The new Army Bill has been passed through both houses of the Hungarian Parliament, among scenes of great violence and disorder.

It is reported in the Press that the eight cavalry divisions of the "Common" Army are to be known in future by numbers, as follows:—

The Temesvar division becomes No. 1 division; the Pressburg division becomes No. 2 division; the Vienna division becomes No. 3 division; the Lemberg division becomes No. 4 division; the Jaroslau division becomes No. 6 division; the Krakau division becomes No. 7 division; the Stanislau division becomes No. 8 division; the Budapest division becomes No. 10 division. Nos. 5 and 9 divisions are at present non-existent. After the new Army Bill has come into force, they will be organized from the Honved cavalry, and have their headquarters at Budapest and Szegedin respectively.

EXPLOSIONS IN POWDER MAGAZINES.—There have been two successive explosions in the military powder magazines at Wellersdorf. At least 40 tons of "ecrasite," the Austrian military powder, have ignited. Besides injury to buildings near the magazines, aeroplane sheds and aeroplanes at the neighbouring aviation ground at Wiener-Neustadt were wrecked; 14 lives were lost and 100 persons injured. The cause of the explosions is not known.

RIFLE ASSOCIATIONS.—The instruction of boys in shooting is making great progress in Austria. The latest returns show that 11,400 boys are being taught to shoot, with the aid of 161 shooting associations.

MANŒUVRES.—The Grand Manœuvres will take place in the Seventh Army Corps district. The troops exercised will consist of the VIIth, XIIth, and part of the IVth Army Corps.

The manœuvres will be concluded on the 12-14th August in the neighbourhood of Mako.

BULGARIA.

COLLISION ON THE FRONTIER.—An incident on the Turco-Bulgarian frontier, near Egri Palanka, is reported from Salonika on June 9th. During the night of the 8th-9th, a Turkish patrol was fired on by Bulgarian troops, and after an exchange of shots the Bulgarians attacked and rushed some Turkish block-houses. Allowing for some exaggeration in the newspaper report quoted, it is still obvious that the state of affairs on this frontier is by no means settled.

LOAN.—The Bulgarian Government is negotiating a loan of £7,200,000. The loan is receiving Russian and French support, but it is doubtful whether the conditions will be settled before the autumn.

CHILE.

CHILE AND PERU.—Chile's present position appears to be to remain in possession of the northern territories of Tacua and Arica, and leave to Peru the onus of forcing her to evacuate them.

REARMAMENT.—The Chilian Army is in process of rearmament, and will be complete by the end of 1913, when her position will be much strengthened.

RAILWAYS.—The longitudinal railway which will run through Chile from north to south will be of great strategical importance. The extreme southern section from Osborno to Puerto Montt is completed, and that between Santiago and La Serena (Coqenibo) is expected to be ready almost immediately. It is thought that the remaining sections will not be ready for four or five years.

CHINA.

GENERAL SITUATION.—Little improvement took place in the situation in China during June. That general unrest still prevails is evidenced by the disturbances that have taken place in such widely distant places as Kashgar on the extreme western frontier of the Republic, in Manchuria, in Chi-nan Fu, the capital of Shan-Tung Province, and in Canton.

MUTINIES OF TROOPS.—In Kashgar the revolutionary troops appear to have quarrelled among themselves, and to have murdered some of the local officials. In the *Times* of the 12th June, it was stated that troops had arrived from Urumtchi, and that the mutinous leaders had been arrested. The same authority reported on the 13th June that three squadrons of Cossacks and two companies of Russian infantry had been moved in the direction of Kashgar, but it does not appear that they have as yet actually entered the city.

In Chi-nan Fu, on the 14th June, two battalions of Provincial troops mutinied, and burned and looted native property. The outbreak, however, was quelled by the troops of the 5th Division stationed outside the city. The mutiny is said to be traceable to the same cause as the mutiny which occurred amongst the 3rd Division at Peking on the 29th February, namely, fear on the part of the troops of being disbanded without provision being made for their future.

The 2nd Manchurian Mixed Brigade at Mukden mutinied on the evening of the 19th June, and indiscriminate shooting went on throughout the night. Several banks and jewellers' shops were looted and burned, and hundreds of houses were destroyed. Foreigners' lives and property were, however, scrupulously respected. Women and children took refuge at the British Consulate. Order was restored on the following day, but all shops were closed, and strong Chinese guards were posted at the city gates.

Street firing occurred on the night of the 14th-15th June, in Canton, opposite the Shameen, several passers-by being killed or wounded. Owing to the increasing unrest in the city a detachment of 170 men of the 126th Baluchistan infantry was sent to the Shameen on the 21st June in relief of a similar detachment of the same corps, which had returned to Hong Kong from the Shameen on the 7th June.

TIBET.—It is reported in the Press that the Dalai Lama left Kalimpong on 24th June en route to Lhasa. Recent reports show the position of the Chinese in Tibet to have become increasingly precarious, but no news of any decisive result to the present struggle has been received yet. The reported departure of the Dalai Lama for Lhasa indicates that the Tibetans feel assured of success. Unsubstantiated reports of the despatch of Chinese relief forces to Tibet have appeared in the Press from time to time.

ENCOUNTER BETWEEN RUSSIAN TROOPS AND HUNG-HU-TZU.—The *Daily News* of the 15th June reports that an encounter took place early in June between Russian troops and Hung-hu-tzu (Chinese brigands) in the neighbourhood of Harbin. About 100 Hung-hu-tzu had fortified themselves in a village near the railway line between Harbin and Ch'ang-ch'un, whence they opened fire on some Russian barracks and a railway bridge. A detachment consisting of two sotnias of Cossacks with quick-firing guns was despatched against the brigands, who were dispersed after an engagement in which the Russians lost one killed and three wounded. Over 40 Hung-hu-tzu were killed and wounded, and six of their leaders captured.

General Chang-Hsün still maintains his headquarters at Yen-Chou Fu, in Shan-Tung. He steadfastly refuses to surrender any of the rolling stock of the line, thus causing heavy losses to the railway authorities, who are urgently desirous of establishing an effective and profitable service of trains.

A MONGOLIAN ARMY.—A Tokyo telegram states that steps are being taken to raise, with the help of Russia, a Mongolian Army, which is to be supplied with modern equipment and to number 100,000 by the end of 1912.

RAILWAYS.—The first through railway service on the Tientsin-Pu-k'ou railway was inaugurated on the 22nd June. The ferries across the Yang-Tzu and Yellow Rivers are, however, not yet constructed.

FLIGHT OF THE PREMIER.—On the 15th June, T'ang Shao-Yi, the Premier, suddenly left Peking for Tientsin, and though urgently entreated to return to Peking and resume his duties he has, up to the present date, refused to do so. He assigns as a reason for his defection the feeling that he has lost the confidence of both foreigners and Chinese. He was followed a few days later by Ts'ai Yüan-pei, Minister of Education, a supporter of T'ang. Lu Chêng-hsiang, Minister for Foreign Affairs, has been appointed to act as Premier during the absence of T'ang.

THE OPIUM QUESTION.—The leading opium merchants of India have recently made representations to the Viceroy regarding the resumption of the culture of opium in China since the revolution. They affirm that China is not carrying out the terms of the Anglo-Chinese Opium Agreement concluded in May, 1911, by which Great Britain agreed to the gradual restriction and ultimate extinction of the opium trade, on condition that China should *pari passu* restrict and ultimately extinguish the cultivation of the poppy within her territory. Reports from travellers in China all point to the fact that the poppy is now being extensively cultivated throughout all the western provinces. As matters stand, the Chinese Government is either unwilling or unable to enforce the terms of the Agreement; and at the same time permits the provincial authorities to prevent the importation of opium from India. In a statement made in the House of Commons in this connection, the Under Secretary of State for India declared that our existing treaty rights cannot be enforced in China, because the "Provisional Government are unable to enforce their will on the Provincial Governments."

CUBA.

THE NEGRO RISING.—The negro rising in Cuba, though still serious, is at present restricted to the east of the Island, in the neighbourhood of Santiago and Guantanamo. No satisfactory explanation has been given of its origin, though there are many rumours, some of which implicate American financiers.

The Cuban Government has about 4,500 troops in the disturbed area; they are, however, unable or unwilling to come into contact with the forces of the negroes, which are roughly estimated at about 1,700 divided into small detachments.

British property has not suffered seriously up to date, and until the Cuban Government has shown its unwillingness or inability to afford adequate protection to either American or British property and subjects, it does not appear likely that the United States will intervene in accordance with the Platt Amendment, which reserves to them the right of intervention *"for the preservation of Cuban independence, and the maintenance of a Government adequate for the protection of life, property, and individual liberty."*

In case of the necessity for protecting American life and interests, the United States despatched, at the beginning of June, 750 marines to Guantanamo Bay, and a gunboat to Nipe Bay at the end of June. Four hundred more marines from Panama were being held in readiness, and the 3rd Division was at Key West, whence it could reach Havana in six hours. The 4th Division of the Atlantic Fleet sailed for Guantanamo on the 5th June. On the 10th June two more battleships joined the flagship at Havana, and several small parties of marines and bluejackets have been landed.

Newspaper reports from Washington, dated 17th June, stated that the Cuban Government had defeated a band of rebels and killed one of their leaders.

FRANCE.

ARMY DEBATE IN THE CHAMBER.—On 18th June, during the discussion of Army Estimates, Major Deiaut pointed out that by October, 1912, Germany would have 705,000 men in the ranks, as compared with 505,000 in the French Army. He suggested that superiority of armament would be found to be the best method of replying to the German increases, in default of a population sufficient to supply additional numbers of men. He proposed the adoption of an automatic rifle, and suggested that recruits should not be trained in frontier corps, which should consist entirely of trained men. Other deputies proposed three years' service for the cavalry and horse artillery, and improvements in the material conditions of officers and N.C.O.'s, in order to attract the very best elements of the nation to the profession of arms.

Monsieur Millerand discussed the German Army Bill, which, he said, was the greatest effort made by Germany since 1870, and would cost her £24,000,000, but that it did not add to her numbers, though it would improve the quality of certain of her troops. He rejected the proposals made by former speakers, observing that they had already been thoroughly considered. His own plan was to increase, very considerably, the numbers of black troops in the service of the Republic; to utilize the reservists to a greater degree, and to have manœuvres for the better training of reservists and of reserve formations.

He said that very shortly a light gun would be introduced for work with cavalry, and that the question of a field howitzer was still under consideration. The infantry would soon be in possession of a lighter equipment.

In the progress of science and industry, the French people must find means to compensate themselves for the weakness of a declining birth rate, and he indicated some of the ways in which this might be done, by adapting to the use of the Army such things as mechanical transport, the telephone and electricity generally.

GOVERNMENT OF FRANCE IN WAR.—The Government was asked to state what measures are to be taken for the government of the country in time of war. Of course, a large number of deputies are still liable to military service, and thus on mobilization the Chamber will be considerably depleted. The War Minister stated, in answer to the questions, that everything had been most carefully thought out, but that it was obviously impracticable to make public their arrangements. Deputies, however, would be granted a delay of eight days in order to pass the measures necessary to meet the immediate situation.

APPOINTMENT.—*Général de Division* d'Amade has been appointed to the command of the 6th Corps d'Armée. Général d'Amade is well known on account of his great successes in Marocco five years ago.

NEW SYSTEM OF NAMING THE HOURS OF TIME.—The Chief of the General Staff has ordered that the hours of time shall be numbered up to 24 consecutively, thus doing away with the necessity of adding in any document referring to military operations a further expression to indicate whether the hour is before or after noon. This system has already been adopted by the railways, and by the post and telegraph office, with both of which military operations are, of course, intimately concerned. By this system 11.30 p.m. becomes 23.30.

PROMOTION.—A new decree has been published regulating the system of recommending officers for promotion. The list of officers who are eligible for promotion (*Tableau d'avancement*) is published annually. The lists of recommendations from which the *Tableau d'avancement* is made up will now be divided into three categories, (a) officers who are normally eligible, (b) officers who for exceptional reasons are recommended although they do not fulfil the ordinary conditions, (c) the complementary list is made up of officers who were on the list of the former year, but who have not been promoted already, of officers who are detached and of officers who would in the natural course of events be superannuated in the next 12 months. In each year the War Minister will publish on July 15th a circular laying down the conditions, as regards age and seniority, which must be fulfilled in order to make an officer normally eligible to have his name inscribed on the *Tableau d'avancement*.

The names of the officers who are recommended for promotion are laid before the War Minister by a committee, consisting of the Chief of the Military Cabinet, the Director of the arm or service of the officers concerned, and a *Général de Division* chosen from those who are not serving in the military government of Paris. This last appointment is made specially to avoid the risk of an idea becoming prevalent that officers who have friends at the War office are likely to obtain preferential consideration. It is the duty of this committee to put before the Minister all the information which is necessary in order to enable him to make up his mind as to the officers who are to be put on the *Tableau d'avancement*.

CAVALRY MANŒUVRES IN 1912.—The following particulars regarding the French cavalry manœuvres of 1912 are summarized from the *Revue de Cavalerie* for June:—

The manœuvres will be in three groups commanded respectively by Generals Marion, Sordet, and De Lastours.

(*a*) The chief manœuvres will be directed by General Marion, a member of the *Conseil Supérieur de la Guerre*. The troops taking part in it will include the 2nd Cavalry Division (General de Las-Latrie), reinforced by the 8th Cavalry Brigade; the 6th Cavalry Division (General Abonneau), reinforced by the 13th Cavalry Brigade; and the 8th Cavalry Division (General Durand de Villers), reinforced by the 7th Cavalry Brigade. (The latter will consist of the 11th Chasseurs and 12th Hussars only). Total 18 regiments.

The scene of operations will be the country between Issur-Tille, Selongay, Praussion, Champlitte and Gray. Regiments will reach the place of concentration on the 24th August; the manœuvres will last from the 25th August to 2nd September.

The 30th Brigade of Infantry will be placed at the disposal of General Marion on the 1st and 2nd September together with a *groupe* of the 48th Regiment of Artillery. The organization of the artillery on the principle of multiples of three, which was recently discussed by the *Conseil Supérieur de la Guerre*, will be experimented with in the 2nd and 8th Cavalry Divisions. Each *groupe* of artillery will consist of three batteries of three guns each.

(*b*) The troops taking part in the manœuvres directed by General Sordet (recently appointed to command the 10th Corps) will include the 4th and 5th Cavalry Divisions and two brigades of cavalry, one of which will be at the disposal of the Director. These fourteen regiments will be concentrated at the camp of Chalons on the 27th August, and the exercises will be carried out on the 28th, 29th, and 30th August. During the combined manœuvres, which will take place from the 31st August to 3rd September (both dates inclusive), between Rethel and the camp of Chalons, General Sordet will dispose of the 132nd Infantry Regiment, from Reims, the 9th and 18th Chasseurs, from Stenay and Longwy, and a *groupe* of the 25th Regiment of Artillery.

(*c*) The 3rd Cavalry Division (General Leddet) and a provisional cavalry division (General Rousseau), formed from the 1st, 2nd, and 3rd Brigades of Cavalry, have been detailed for the manœuvres directed by General Dor de Lastours. These troops will be concentrated on the 20th August; brigade manœuvres will take place on the 22nd, 23rd, and 24th; the two divisions will manœuvre against each other on the 25th and 27th; and on the 28th and 29th combined manœuvres will take place, with the assistance of an infantry regiment from Beauvais. The scene of operations will be the area Beauvais—Breteuil—Saint Just en Chaussée—Clermont.

It is to be observed that in the above exercises the cavalry division will be composed of six regiments each, thus anticipating the future *cadre* law. Similarly in the army manœuvres in the west, the 1st and 7th Cavalry Divisions will be completed to six regiments by the addition of a provisional regiment of dragoons. On the other hand, the only corps cavalry will be one regiment of light cavalry each for the 9th, 10th, and 11th Corps; a cuirassier regiment for the provisional corps; and a regiment of Chasseurs for the Reserve Division. Cavalry regiments taking part in the manœuvres are to be made up to strength in horses, vehicles, etc., by two regiments which do not appear in the "order of battle."

French Colonies.

ALGERIA.—The working of the new conscription law in Algeria has, on the whole, been satisfactory, though there has been some feeling on the part of the natives that if they are to be allowed to share the personal burdens of French citizens they should likewise be allowed to share in the work of governing by exercising a vote.

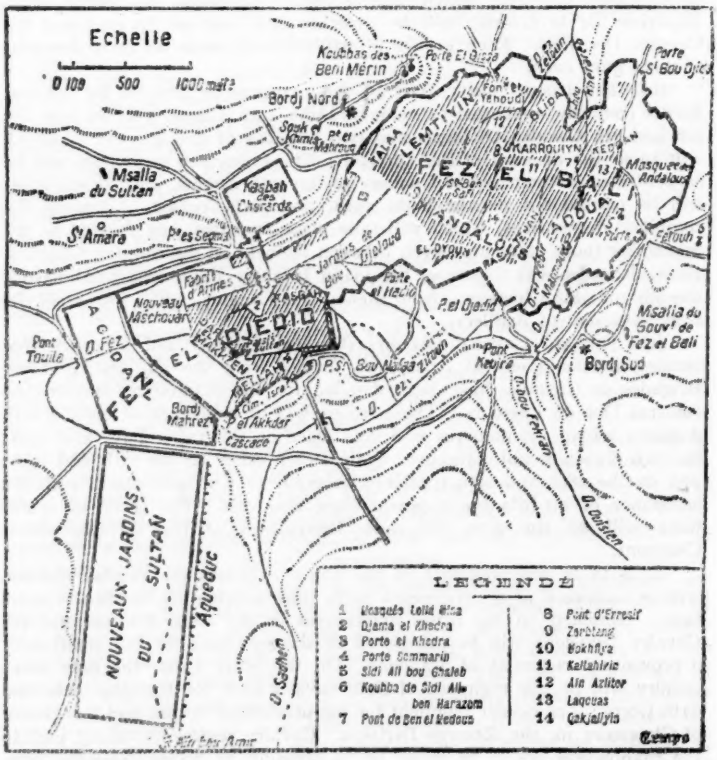
At Nedromah, in the department of Oran, and at Batna, in the department of Algiers, the greater part of the conscripts refused to present themselves, but otherwise everything seems to have gone smoothly.

WEST AFRICA.—A further advance of the West African railway from Thies to Kayes has been authorized.

Marocco.

GENERAL SITUATION AT END OF JUNE.—The condition of affairs has improved, chiefly owing to the successful operations undertaken by General Gouraud from Fez and by General Alix on the left bank of the Muluya. There is no reliable news of the movements of El Haiba, the southern pretender.

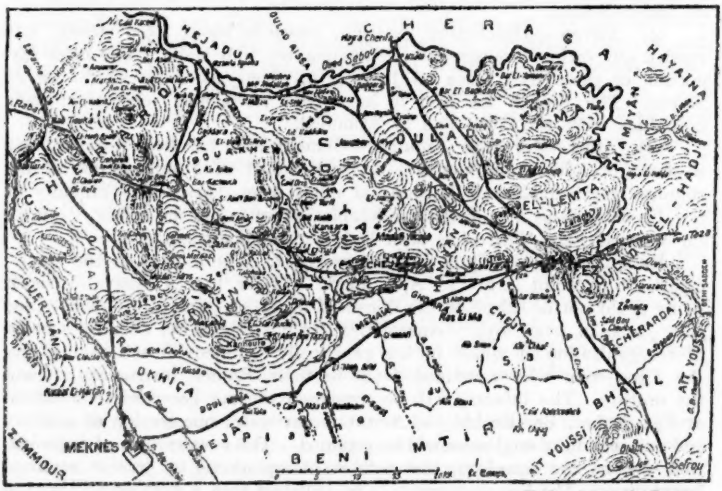
THE TOWN OF FEZ.



[Reduced from the *Temps*.

THE ATTACK ON FEZ.—Further details are now available of the attack on Fez at the end of May. The Moors numbered from 8,000 to 10,000, grouped in four bodies and mainly recruited from the Beni Warain, Dsui and Hiayna tribes. They made a simultaneous attack on the east and south-east sides of Fez at 10 p.m. on the 25th May and gradually extended their attack round the northern and southern sides of the town, actually penetrating into it near the Mosque Bab-Guissa. In the morning French reinforcements took the Moors in reverse on the northern face and gradually cleared the ramparts, with the assistance of the artillery in the town. There was considerable hand-to-hand fighting during the night, the French casualties amounting to 38 killed and 60 wounded. On the 28th another attack was made by 5,000 to 6,000 Moors against the north and east of the town, which was successfully beaten off with a loss to the French of seven killed and 14 wounded. On the 29th another attack was feared, so General Gouraud took the offensive with a flying column of eight companies, one squadron and a mountain battery and successfully broke up the nearest "harka." On June 1st, Gouraud, whose force had been increased to five battalions, two squadrons and six sections of artillery, resumed his offensive movement towards the north-east and completely dispersed the Moors, inflicting very heavy loss; on the following day he advanced to Ain Sbit, 12½ miles from Fez, having encountered no further resistance.

THE NEIGHBOURHOOD OF FEZ.



[Reduced from the *Temps*.

The total number of Moors killed between 25th—28th May is estimated, from the numbers actually buried, as being from 500 to 600. In addition to the French losses already mentioned, Gouraud's column lost 12 killed and 31 wounded, including the English instructor, Sergeant Redman, who had repeatedly shown distinguished courage during his service in the Maroccan Army. These military operations were conducted under the command of General Moinier; the forces at his disposal were as follows:—

Fez City.—Two battalions infantry; two sections artillery; two sections machine-guns.

Dar Debibagh (Fez suburb).—One battalion infantry; one section artillery.

Flying Column.—Six companies infantry; one squadron; one mountain battery.

In addition, two squadrons, two battalions and one section of machine-guns arrived at Fez from Mekinez on 20th and 29th May.

SUBSEQUENT OPERATIONS. (*a*) *Gouraud's Column.*—After successfully clearing the neighbourhood of Fez, General Gouraud extended his operations to the country between Fez and Taza, his base being Sour Tleta, 20 miles north-east of Fez. The column has met with constant opposition and it has been found necessary to burn villages and crops. Although the fighting has been of a more or less desultory character, the French had eight killed and 12 wounded on June 17th, three killed and 11 wounded on the 19th, and two killed and 13 wounded on the 22nd.

(*b*) *Dalbiez's Column.*—General Dalbiez left Fez on June 18th with four battalions, two squadrons and three batteries of artillery, his mission being to clear the country south of Mekinez and to prevent raids on the Fez—Mekinez road. Some opposition has been met with, notably on the part of the Beni M'tir on June 19th and 20th, when the French casualties were five killed and 16 wounded, and on the 21st, when the French lost four killed and six wounded during a successful sortie from their camp at Abd-es-Salam.

(*c*) *Sefrou.*—The Sefrou garrison, which is about 1,500 strong, has carried out various counter-attacks against the Sidi Raha. The most important of these took place on June 15th, about six miles south-east of Sefrou. The French are said to have been completely successful; their casualties were six killed and 27 wounded.

(*d*) *Algero-Moroccan Frontier.*—General Alix has been carrying out a series of military promenades on both banks of Muluya;[1] one of his columns reached Kasbah M'soun, 22 miles from Taza. The ubiquity of the French troops has had considerable influence on the tribes, even as far west as Fez. There has been little active opposition.

REORGANIZATION OF THE SHEREEFIAN ARMY. The mutiny of the newly-created Shereefian Army in April made it clear that a native Moorish Army could not be raised on the lines laid down by General Moinier. (See June JOURNAL, page 863). General Lyautey has, therefore, issued a scheme of reorganization in which he has practically confined himself to utilizing the 1,200 men who remained loyal to their French instructors during the mutiny. The infantry will be composed of four companies, stationed at Fez, Rabat, Ber Rechid and Settat respectively; one section of artillery and one section of engineers will be retained. The cavalry unit of organization will be the squadron, the number of squadrons at present retained being three. The Fez company is to be stiffened with a number of Algerian riflemen.

PORT COMMISSION.—A Commission to study the question of the Atlantic ports of Marocco, from the technical point of view, sailed from Marseilles on the 21st June. It consisted of six members, under the presidency of M. Guérard, "Inspecteur Général des ponts et chaussées."

DEPARTURE OF THE SULTAN FROM FEZ.—The Sultan left Fez for Rabat on June 6th, accompanied by M. Regnault, and successfully accomplished

[1] See Map in June JOURNAL, page 865.

the journey. Rumours of the intended abdication of the Sultan continue to be circulated. During the Sultan's absence, Mulai Yusuf, his brother, will act as his representative at Fez.

GERMANY.

FRANCO-GERMAN CONGO COMMISSION.—This Commission met at Berne last month and commenced deliberations to prepare the definition of the territories ceded in the treaty of November, 1911, concerning Equatorial Africa. The decisions arrived at will require ratification by the two Governments.

THE BIRTH RATE.—The statistics for 1911 in the German Empire show an increase of population of less than three-quarters of a million—the least favourable return for nearly 20 years. The Prussian Government is now organizing an enquiry as to the causes of the decrease.

IMPERIAL FINANCES.—The final returns of Imperial revenue for the financial year 1911, which ended on April 30th, 1912, show a total surplus over estimates of £11,350,000; most of this surplus is accounted for by Customs.

THE NEW ARMY CORPS (XX. AND XXI).—The headquarters of the XXI. Corps will be at Saarbrücken, while that of the XX. Corps will be at Allenstein. Divisional headquarters of the 37th and 41st Divisions will be at Allenstein, and at Deutsch Eylau respectively.

RECRUITING MUSTER FOR 1912.—There were 1,226,730 men on the rolls, of whom 856 were not eligible. Of the remainder, 34,496 were found unfit, 138,743 were drafted to the *Landsturm*, 91,132 to the *Ersatz* Reserve and 218,541 were taken for service, exclusive of volunteers and special enlistments. The service of the remainder was postponed.

THE EIFEL DISTRICT.—The Prussian Great General Staff have this month travelled in and inspected the Eifel district with a view, it is said, to examining the railways and the roads, the latter for motor traffic for future manœuvres.

New peace stations for some of the troops of the new Army Corps are to be located in the district.

COMBINED MANŒUVRES AT BORKUM.—Manœuvres were held to test the facility of reinforcing Borkum from the mainland and for landing troops against an enemy who might have gained possession of the island. The manœuvres are said to have been successfully carried out.

SHIELDS FOR MACHINE GUNS.—It is reported in the Press that the Small Arms Committee have decided against shields for machine guns for use in the field, as being too heavy.

TRAINING OF OFFICERS OF THE RESERVE.—Opportunities are to be given this summer to reserve officers to take part voluntarily in regimental training extra to the obligatory training. For this purpose Government horses will be placed at the disposal of reserve officers belonging to the mounted branches of the service.

MOTOR TRACTION.—It is said that the total number of motor vehicles subsidized for military purposes amounts to 1,000 in round numbers. The result of the census of motors taken on January, 1912, were as follows:—Total 70,318. Of this number 53,132 were light motor carriages and 7,156 heavy motors.

Of the light vehicles 20,508 were motor bicycles for personal use; 157 were motor bicycles for business use; 22,942 were motor cars for private use; 19,555 were motor cars for business use.

The census for 1912 shows an increase of 7.84% on that for 1911.

German Colonies.

S.-W. AFRICA: LOCAL TROOPS.—The troops in German S.-W. Africa have been reduced since 1st April, 1912, to 1,907 of all ranks, being a reduction of 209.

Camel Breeding.—A Government stud farm for camels has been started at Kalkfontein, near Gochas, as these animals have proved their value in this colony.

EAST AFRICA RAILWAYS.—It is reported that the Tabora (or Central) line will be made to reach Lake Tanganyika at the end of 1913 instead of 1914, as the Belgian authorities have decided to accelerate the construction of their line to the west shores of that lake. The earthwork of the new section (W. of Tabora) is already finished, and the rails are being laid. That portion between Tabora and the Malagara River is said to present no difficulties (with the exception of a bridge 150 metres long over the river), but further west considerable gradients are involved.

The success of the Uganda railway has led to the suggestion that a connection should be made from the central line northwards to Lake Victoria, to enable German East Africa to get its fair share of the trade on the lake, which at present is entirely diverted to the Uganda railway. A steamship line to run in connection with the proposed railway is also advocated.

TOGO LAND. *Financial Progress.*—The finances of Togo Land show a considerable improvement during 1911. Taxes brought in £15,500 more than was estimated, and £1,100 more than in the previous year. Special expenditure was incurred for replacing landing stages, for combating "sleeping sickness" and for a segregation hospital for contagious diseases. During the year the revenue showed an increase of £41,000, as against an increased expenditure of £8,640, giving a surplus of £32,360.

KIAO CHAO. *Economic Progress.*—The arrival of many well-to-do Chinamen in the colony has given a great impetus to building in all parts of the town, and the influx of Chinese is expected to continue. A number of new wharves and godowns have been erected, and considerable expenditure on communications and harbour works is to be expected in the near future.

Political Development.—The new self-governing committee will shortly hold its first session. It will consist of 12 elders, two representatives from each of the commercial associations in Tsingtau and Litsun, two teachers in the Government elementary schools and one representative from each of the two main religious denominations.

GREECE.

MANŒUVRES.—The manœuvres were carried out in the country between Thebes and Athens; the troops taking part being the 1st and 2nd Divisions, reinforced by five battalions of the 4th Division, from the garrisons of Nauplia, Argos and Corinth. Operations began on May 23rd.

At the end of March, 1912, the whole of the recruit contingent for 1903 was called out for three months' training; the number of men thus assembled was 7,000, most of whom were untrained.

These untrained men were associated with trained soldiers and reservists from the recruit contingent of 1906, who had been called up for one month's training; it thus became possible to add a fourth company to

each battalion, and regiments proceeded to the manœuvre area with 12 companies, each 150 strong.

The composition of the force exercised at manœuvres was, therefore, as follows :—

The Staff of General Eydoux.
Divisional and Regimental Staffs.
Two divisions, each of three regiments.
One regiment from the garrisons of Nauplia (three battalions).
One battalion from Argos, and one battalion from Corinth.
Two engineer companies.
One cavalry regiment.

One division was provided with two artillery "divisions," each of two batteries, and the other with two artillery "divisions," each of three batteries.

These manœuvres are the first which have taken place for three years. They lasted nine days, and as the troops were conveyed to the manœuvre area partly by sea and partly by rail, much useful experience was gained.

FINANCIAL.—The revenue for 1911 shows an increase over that of 1910 of three and a half million francs (£140,000).

ITALY.

EDUCATION OF OFFICERS.—To provide for the deficiency of officers, accelerated courses are being established at the military school at Modena and at the Military Academy at Turin. Admissions are made without examination on the production of certain certificates. After 16 months at the Military School students will be appointed sub-lieutenants. On September 1st, 1912, an accelerated course of 14 months at the Military School will begin for sub-officers who wish to be promoted to the rank of sub-lieutenants.

FINANCE.—The Minister of War has introduced a Finance Bill, asking for a supplementary estimate of £2,400,000, to be spread over a period of six years, £240,000 for each of the two financial years 1912-13 and 1913-14, and £480,000 for each of the succeeding financial years.

The money is required for the following purposes: —

(1)	Small arms and machine guns	£240,000
(2)	Mobilization equipment	160,000
(3)	Coast and fortress defence armament, and siege train	600,000
(4)	Coast and fortress defence works, and military railways	720,000
(5)	New military buildings, repair and alteration of existing buildings, establishment and improving of practice camps and camps of exercise, purchase of land ...	200,000
(6)	Purchase of animals for cavalry, artillery and machine guns	200,000
(7)	Balance for eventualities	280,000
	Total	£2,400,000

ITALIAN COLONIES.—A Ministry for the Colonies has been formed at Rome. The expenditure provided for in the Budget 1912-1913 will not exceed £8,000.

JAPAN.

APPOINTMENTS.—Major-General Sato has replaced Major-General Abe in the command of the Japanese garrison in North China.

Lieut.-General Baron Y. Fukushima, who was previously Vice Chief of the General Staff, and is celebrated as a traveller, has succeeded General Viscount Oshima as Governor-General of the Kwantung leased territory.

FINANCE AND DEFENCE.—The Cabinet has organized a committee of experts under the presidency of the Premier, and has assigned to them the task of revising the organs of State with a view to obtaining greater economy and efficiency.

The daily Press in Japan has lately been inveighing against alleged extravagance in the two fighting services; several retired officers of both services joining in the cry. Exception is taken especially to the number of higher officers and officials, and the want of economy in offices.

JAPANESE ENTERPRISE IN THE PACIFIC.—The President of the Toyo Hogei Kaisha, a commercial firm, has stated in an interview that his company obtained last November a fishing lease over 800 miles of the Mexican coast, and that the same firm is also negotiating for leases from Chile and Peru.

MEXICO.

THE OROZCO RISING.—In the fighting which took place at the end of May, the Government forces under General Huerta inflicted a decisive defeat on the rebels under Orozco, and the latter are reported to have lost 800 killed and wounded. The rebels retreated northwards to Jimenez, destroying the railway bridges behind them. The result of this engagement has caused numerous desertions from the rebel ranks, and a corresponding increase in the numbers alleging loyalty to the Government.

A great exodus of foreigners has taken place from the State of Chihuahua, owing to the inability of Orozco to afford protection to them against the violence of the populace, who consider that the defeat of Orozco is due to the action of the United States Government in helping to equip the Mexican Government forces, and refusing to sell arms to the rebels. The plans of the rebels appear to be to make a stand in the mountain passes near Bachimba, about 46 miles south of Chihuahua. It will take the Government forces considerable time to repair the bridges and advance so far north, and in the interval the rebels hope to procure fresh arms and ammunition.

It is considered that the general state of affairs has improved in a marked degree.

MONTENEGRO.

FRONTIER INCIDENT.—A frontier incident between Turkish and Montenegrin troops took place at the end of May, in which two Montenegrin soldiers were killed.

On June 19th a series of lively skirmishes between Turkish troops and the Mirdite tribe took place on the Montenegrin frontier.

POLITICAL.—The Montenegrin Government resigned in the middle of June, and a new Government was formed under General Marlinovetch.

OTTOMAN EMPIRE.

ALBANIA.—In spite of optimistic reports from Turkish official sources, it appears that fighting with the insurgents was still going on at the end of June in Central Albania and near the Montenegrin frontier. It is reported that the population of the Scumbi valley has also joined in the revolt. The authorities are making special efforts to capture Issa Boletinaz, who is said to have been defeated near Vuchitrn by Fadil Pasha.

On the 22nd June portions of the garrisons of Monastir, Pribib and Debra, variously estimated at 1,000 to 4,000 strong, mutinied under the leadership of Captain Tajar Bey. The rising was apparently due to discontent with the influence of the Committee, especially in regard to its conduct of the recent elections. The mutineers have formulated demands, including impeachment of certain members of the Committee and the holding of fresh elections. Some 14,000 troops have been drafted from Constantinople and the Dardanelles to the disturbed area, but these may be, in part, intended to operate against the Mirdite clans. So far no active steps to suppress the mutiny appear to have been taken. This is ascribed to the unwillingness of the Government to embark on anything resembling civil war, and also, it is said, to doubts as to the reliability of the troops in the neighbouring garrisons.

On the 1st July the mutineers were reported to be retiring towards Delvina, and showing no disposition to come to terms.

The rising has revealed the existence of a "League of Military Unity," which is hostile to the Committee, and has branches in many garrisons. The Chamber has accordingly passed a law prohibiting officers under heavy penalties from taking part in politics.

PARAGUAY.

GOVERNMENT VICTORY.—The rebel troops under Jara were defeated at Paraguari on the 11th May by the Government forces, and were completely routed. Jara died of his wounds four days later. The bulk of the artillery and machine-guns are now in the hands of President Navarro's Government, and with the disappearance of Jara and the defeat of the Civico forces under him, it is to be hoped that the present Government of Paraguay may be able to maintain its position in peace at least for a time.

PERSIA.

The internal state of the country remains generally chaotic. The Regent left Tehran for Europe on 11th June.

DISTURBANCES IN KERMAN.—Intrigues against the Governor led to a serious state of affairs at Kerman during May, when 3,000 rebels marched against the town. The Governor, however, managed to hold his own, and the disturbances have since subsided.

M. Mornard has been confirmed in his appointment as Treasurer-General for a period conterminous with his existing contract as Director-General of the Customs. He will combine the functions of the two appointments.

THE RUSSIAN FORCES IN PERSIA.—The Russian Press announces the return early in April of the 206th Salyanski Regiment from Kazvin to Baku, their permanent peace station.

A Russian account of the fighting at the end of May near Ardebil between Russian troops and the Shahsevans, gives the losses of the former as ten killed and eighteen wounded, and of the latter as over 100.

SALAR-ED-DOWLEH.—The Government troops under Farman Farma were victorious in a skirmish with the advanced guard of Salar-ed-Dowleh's army, but were defeated subsequently in an engagement about 28 miles from Hamadan. Their opponents appear to have been the detachment under Mujallal-es-Sultaneh. On May 29th, the force under Mujallal-es-Sultaneh was completely defeated in turn by Yprim. The latter, however, was killed. After a fight with the partisans of Salar-ed-Dowleh near Sahneh on 29th May, in which Daud Khan and his eldest son, as well as other leading Kalhurs, were killed, Farman Farma, with the Government forces, arrived at Kirmanshah on 30th May.

TURCO-PERSIAN FRONTIER.—A collision between Turkish and Persian troops occurred some weeks ago near Kotour, but no serious results have ensued. Reports state that the Turks have now evacuated Dilman.

LANDING OF BRITISH TROOPS.—Owing to a threatened attack on Bandar Abbas during May, by 400 raiders, H.M. ships landed a party for the protection of the town, and troops were sent up from Jashk. The raiders thereupon retired, and the British troops were withdrawn.

ARMS TRAFFIC.—The trouble at Lingeh (see May JOURNAL, page 738) having quieted down, the detachment landed there was withdrawn during April.

TRANS-PERSIAN RAILWAY.—It is reported in the Press that Mr. Johns has found a good route for a railway from Karachi to Gwadur, with a general gradient of 1/250; the steepest gradient being 1/90.

The first meeting of the Société d'Etudes for the proposed Trans-Persian Railway was held in Paris during June. The directors number 24, of whom eight represent Great Britain, and an equal number France and Russia, respectively. A committee was deputed to communicate with the Governments concerned with a view to the completion of the necessary surveys and to obtaining from Persia a concession for the line.

PORTUGAL.

ANNUAL LEVY.—The contingent for 1912 would have been 46,000 men, but as barrack accommodation is wanting, it became necessary to reduce the numbers, and 10,000 were excluded on a more rigorous medical examination.

Recruits who provide their own food and lodging are allowed to live out of barracks.

WIRELESS TELEGRAPHY.—Mr. Marconi has recently visited Lisbon to confer with the Government regarding the installation of wireless stations in the Azores, Madeira, and Cape Verde Islands, and also in the Portuguese colonies.

RUMANIA.

UNIFORM.—A new uniform, grey green in colour, has been issued to the troops. It consists of an overcoat, a tunic with a red collar, and a blouse with four pockets. The buttons on the garments of the rank and file are oxidised, gold lace and other ornaments are done away with. Other articles of clothing remain unchanged, with the exception of a slight alteration in the colour of the headdress.

RUSSIA.

APPOINTMENTS.—The following appointments are announced:—Lieut.-General Plyeshkov to command the First Siberian Army Corps. Lieut.-General Toman to command the Third Caucasian Army Corps. Lieut.-General Nishchenkov to command the Fourth Siberian Army Corps.

CONSULAR GUARD AT KASHGAR.—It is stated in the Press that a reinforcement of three sotnias of Cossacks and two infantry companies was despatched to the Russian Consular Guard at Kashgar about the 1st June.

ARTILLERY SCHOOL AT ODESSA.—The Duma has approved the establishment at Odessa of an additional artillery school for the training of young men for the rank of officer. Two other artillery schools exist already in St. Petersburg.

TRAINING OF RESERVISTS DURING 1912.—Instructions have been issued for the calling up of persons belonging to the reserve for training during the current year. Ordinary infantry, field artillery, fortress artillery, and engineer reservists, who belonged to the 1905 and 1907 contingents of conscripts, will be called up in the autumn for a six-weeks' training. This order is modified as regards the Kazan, Vilna and St. Petersburg districts. Sub-ensigns and volunteers who passed into the reserve in 1905 and 1911, and reservists, educationally qualified for the rank of officer, who belonged to the 1905 and 1907 contingents, of all arms of the service, are to be called up for a six-weeks' course of instruction at training camps.

SERVIA.

NEW WAR MINISTER.—A new War Minister has been appointed, in the person of the late Chief of the General Staff, General Putnick.

MANŒUVRES.—Big manœuvres will take place this autumn in the Morava valley. About 60,000 men will be exercised.

PURCHASE OF WAR MATERIAL.—The Government has laid a Bill before the Skupstina, asking for an extra credit of nearly £850,000, for the purchase of war material.

SIAM.

RAILWAYS.—It is reported that 300 kilometres of the railway which will eventually link Bangkok with Singapore have been completed after one and a half years' work. Eight hundred kilometres remain to be completed, two-thirds of the distance being now in course of construction.

HEAVY GUNS.—It is stated in the Press that the officers of the active army have agreed voluntarily to forego part of their pay to establish a fund for the purchase of heavy guns.

SPAIN.

MILITARY EXPENDITURE.—The 1913 Budget, which was recently introduced, is of interest. In consequence of the heavy expenses of the Riff campaign, estimated up to 1911 at £6,800,000, the steady improvement in the Spanish financial position since 1900 has been checked. The estimated revenue for 1913 is £43,250,000, of which 40% is required for the service of the debt.

A supplementary Budget will be introduced in the autumn for dealing with "extraordinary expenditure" up to 1921, and meanwhile a special heading has been introduced showing the expenses of Spanish action in

Marocco. £1,875,000 is allotted for this in 1913, and an economy of £800,000 has been effected in the department of the Ministry of War.

SWEDEN.

MANŒUVRES.—The First, Second, Third, and part of Fourth Divisions, and engineer troops from the garrison of Boden, will take part in Army manœuvres in October. The operations will be held in the provinces of Skarborg and Elfsborg, and the King of Sweden will be present.

TRIAL MOBILIZATION.—Parliament has voted the funds (about £30,000) required for the 15 days' trial mobilization to be held at the end of this year, or early in 1913. A Bill has also been passed which forbids employers from dismissing men who are called up to attend trial mobilizations.

SMALL ARM AMMUNITION.—The problem of using up the old pattern ammunition in view of the introduction of the pointed bullet has been discussed in the Press, and it is stated that it would take 18 years to expend the 1894 pattern ammunition at the rate of 10,000,000 rounds per annum. It is proposed, therefore, that this old ammunition should be issued to the rifle clubs at one penny per round, in which case the stock could be worked off in about six years.

FORTIFICATION OF KALIX ELF.—A report in the Press states that a Patriotic Society has offered to undertake the preparatory work required for the fortification of the valley of the Kalix River, near the Finnish frontier, as the Government has not shown any inclination to take action.

UNITED STATES.

TRADE.—The Trade Report of the United States for 1911 points out that exports of farm produce in 1895 represented 75 % of the total exports. In 1910 this percentage had fallen to 55, and this decrease points to the fact that the United States are approaching the time when they will consume practically all the farm produce grown, and will cease to be exporters of food stuffs.

IMMIGRATION.—The recent Report by the Commission on Immigration shows that during the past few years more immigrants have come from any of the three countries—Austria-Hungary, Italy, or Russia—than from all those North-European countries taken together, which formerly furnished the bulk of European immigrants.

The population in greater New York has altered between 1900 and 1910 as follows:—

From Ireland, a *decrease* of 165,161; from England, do. 29,795; from Scotland, do. 5,196; from Germany, do. 192,893. From Russia an *increase* of 416,429; from Italy, do. 302,717; from Austria-Hungary, do. 234,842.

The Report explains at some length the disadvantages of encouraging immigrants from the three last-named countries, the chief of which is their inability to assimilate themselves to the new conditions of life.

AERONAUTICAL NOTES.

GREAT BRITAIN.

FLIGHTS ALONG THE CHANNEL COAST.—On Thursday, July 4th, Commander Samson, Royal Flying Corps, on a Short hydro-aeroplane, flew with a passenger from Eastchurch to Portsmouth, a distance of 194 miles, in 3½ hours. The route taken was by the South Foreland, and thence along the Channel coast about 15 miles off the shore. On reaching his destination, Commander Samson alighted easily on the sea off Eastney Barracks, the machine skimming along the water for some distance before settling on the floats.

Lieutenant Spencer Gray, also on a Short hydro-aeroplane, and carrying a passenger, started from Eastchurch at the same time as Commander Samson, but was forced to descend on the sea off Newhaven, owing to a defect in his engine. He succeeded, however, in repairing the damage while floating, in spite of the roughness of the sea, and proceeded on his way, reaching Portsmouth two and a half hours after Commander Samson. It is interesting to compare these flights, especially as regards time, with the example given in "Aircraft for Sea Service" (June JOURNAL, page 764) of an aeroplane-coast-reconnaissance from Cape Clear to the Blaskets.

On the morning of the same day Lieutenant L'Estrange Malone made a flight from a platform fitted on the forecastle of the battleship "London," when at sea about 20 miles from Portsmouth, and descended at Eastney.

NEW HYDRO-AEROPLANE.—A new "Short" hydro-aeroplane (S. 43) has been acquired for the Naval Wing of the Royal Flying Corps at Eastchurch; it is fitted with a wireless telegraph installation, and carries petrol and lubricants sufficient for a six hours' continuous flight. During its trials it attained a speed of 62 miles per hour, carrying two persons.

ACCIDENT TO THE "GAMMA."—On the 6th June, at Farnborough, the Army airship "Gamma" got out of control, owing to a strong wind, as she was about to make an ascent. A collision with the factory buildings was only averted by pulling the ripping cord, with the result that the envelope collapsed, and was seriously damaged by some railings.

ARGENTINA.

A local firm of tobacco merchants has presented an aeroplane to the War Office, and projects for the creation of an aerial fleet for army purposes by means of public subscriptions are being enthusiastically supported.

AUSTRIA-HUNGARY.

PURCHASE OF AEROPLANES.—Fourteen Etrich aeroplanes have been ordered by the Army Department, and will be delivered at Wiener Neustadt, ready for use, by the end of July.

TRAINING COURSES.—Twelve senior General Staff Officers are to be trained as observers from aeroplanes and balloons during the months of June, July, and August. The course will last 14 days, and will include instruction in all branches of work connected with aviation. Aviation courses for other officers will be held between April 21st and October 26th. Thirty-four officers will be trained, 27 in the management of aeroplanes and seven for work with dirigibles and balloons.

BULGARIA.

PURCHASE OF AEROPLANE.—The citizens of Orechowo (a town on the Danube) have decided to subscribe for the purchase of an aeroplane, which they intend to present to the infantry regiment in garrison at that town.

FRANCE.

DIRIGIBLE HEIGHT RECORD.—The Clément-Bayard III., which last month achieved a height record of 2,900 metres, has successfully passed its further trials, and remained in the air for 15 hours, with 11 persons on board, but its height record has now been beaten by the *Dirigeable-éclaireur* "Conte," which ascended to 3,050 metres (9,924 feet). The "Conte" has a cubic capacity of 6,500 cubic metres, and is driven by two Chenn motors, 75-100 h.p. each.

TESTS OF MATERIAL: AEROPLANES.—Experiments have been carried out with aeroplanes mounted on railway trucks drawn by powerful engines at the rate of 60 miles an hour, with a view to testing material, and also to record pressures with the wings of the aeroplane in various positions. A special electric railway, six miles long, is now being projected near Pau for this sole purpose.

GRAND PRIX RACE.—The race for the *Grand Prix de l'Aéro-Club* was held on June 16th and 17th between Angers—Chozet—Saumur, over a triangular course of about 98½ miles. The conditions required a flight of three laps on June 16th, and four laps on the following day. Only two competitors completed the first day's work, owing to the extremely unfavourable weather conditions, and one of these two finished his third lap after closing time. This left only one competitor to take part in the race on the second day. Garros, the winner, showed great skill and pluck, and the completion of his fourth lap was the signal for an outburst of wild enthusiasm. Garros used a Blériot monoplane.

GERMANY.

Dirigibles.

"VICTORIA LOUISE."—The airship carried out a 350 mile continuous flight, with 25 passengers, across Holland and round the Dutch coast, landing at Hamburg after starting from Düsseldorf. On June 21st the airship made her 100th ascent.

"Zeppelin 3."—The new "Z 3" made a successful flight from Friedrichshafen to Hamburg at the end of May. During the journey a speed of nearly 43 miles per hour was maintained, the total distance being 430 miles. There were 12 persons in the car. After performing several journeys in the neighbourhood of Hamburg the airship returned to Friedrichshafen in the middle of June. On arrival an explosion of gas occurred while the balloon was being deflated. The necessary repairs will take some little time as the damage inflicted appears to have been considerable; two employees were injured.

"ZEPPELINS" FOR THE NAVY.—It is announced that two airships of the "Zeppelin" type have been ordered for the Navy, one of which is to be ready in the autumn.

THE "SCHWABEN."—This airship completed her 200th journey at the beginning of June, having accomplished 1,560 miles, and carried 5,000 persons.

On the 28th June, while being brought into her shed, she was struck by a gust of wind and driven against the wall. The gas exploded, and

the vessel was completely destroyed, some 30 soldiers who were holding her being more or less severely injured. She was insured in England for £20,000.

THE "SCHÜTTE LANZ."—This airship has been repaired after the accident recorded in a previous summary, and has carried out successful flights from Mannheim.

THE "SUCHARD."—Hopes are entertained that the "Suchard," built for the trans-Atlantic flight, may be ready in the Autumn. If so, the airship is to be taken to pieces and transported to Madeira.

"PARSEVAL 3."—The "P 3" made a successful journey from Tegel (Berlin) to Königsberg, where she is to be stationed for the present.

Aeroplanes and Aviation.

THE NATIONAL AVIATION FUND.—This fund reached a total of £150,000 by the beginning of June.

BERLIN—VIENNA RACE.—The only competitor to complete the course was Hirth, on a Rumpler monoplane, who covered the distance of 713 miles in five hours 36 minutes, exclusive of the halt at Breslau.

AIR MEETINGS.—The German flying week at Berlin, the Saxon meeting at Leipzig, and the meeting in the "Nordmark," took place during the month. On the whole the meetings did not fulfil the hopes entertained of them, but good flights were witnessed on several occasions; unfortunately a number of fatal accidents occurred.

THE ETRICH "AIRCOACH": "MILITARY TYPE 1912."—Etrich has produced an aeroplane with a completely closed-in body, which can contain three persons. The aeroplane is of the "Taube" pattern.

HYDRO-AEROPLANES FOR THE NAVY.—Very successful experiments have been conducted at Danzig with hydro-aeroplanes fitted with clockwork wireless instruments. Six two-seated machines have been ordered for the autumn naval manœuvres.

METEOROLOGICAL BUREAU FOR WARNING AIRMEN.—From June 1st the organization of this service has been augmented by a second centre at Frankfort a.M., the other centre being at Lindenberg.

AVIATION IN THE COLONIES.—According to a newspaper account, the German South-West African Estimates for 1913 include £500 for the provision of flying machines. The same account states that the latter step has been taken after local meteorological observations which prove the possibility of using aeroplanes.

ITALY.

A new dirigible, "M.I.," has completed successful trials at Vigna di Valle. This dirigible is considerably larger than those in use in Libya. Its principal measurements are:—Length, 272.3 feet; breadth, 55.7 feet; volume, 15,696 cubic yards. The cradle or carriage is 55.7 feet long and 6.5 feet broad. The dirigible is driven by two motors, each having a screw diameter of 12.4 feet, and 200 h.p. It is armed with two machine guns, and two bomb tubes.

RUSSIA.

PERSONNEL.—It is reported that the officer personnel for the Russian Air Companies will be taken from all branches of the service. Each company will have a lieut.-colonel, a captain, five lieutenants, and a secretary.

AEROPLANES.—A report in the Press states that the War Council has decided to order 150 Nieuport aeroplanes. A factory will be opened in Moscow, and 140 of these machines will be built in Russia. The Dux company of Moscow is about to undertake the construction of Farman machines. Gnome engines will also be manufactured in Moscow.

On the 30th May, at the Sevastopol Aviation School, a committee tested an aeroplane of the Farman type, which had been constructed in the workshops of the school. It is reported that the aeroplane was satisfactory, and equal to those constructed in special factories.

UNITED STATES.

AEROPLANE GUN.—Preliminary tests with a new Q.F. aeroplane gun have been carried out. The gun was worked from a biplane 300 feet in the air, and made a favourable impression. It is said to be capable of firing 500 shots a minute.

PURCHASE OF AEROPLANES.—The appropriation for aviation available until June 30th will be drawn upon to purchase one Wright, one Curtiss, and one Burgess-Curtiss aeroplane, all of which, after delivery, will be sent to College Park, Maryland. These, with those on hand, will make 13 aeroplanes at that place, of which four will be fitted with hydroplanes for the purpose of alighting on the water. There is, in addition, one aeroplane in the Philippines and one in Texas.

WRIGHT WAR BIPLANE.—A "war biplane," built by the Wright brothers for the Signal Corps, has been tested at College Park, one of the conditions being that it should fly for four hours at not less than 45 miles per hour with 450 pounds on board, not including gasoline, oil and water. In this test it averaged 52 4/5 miles per hour. In the second test, which was to climb 2,000 feet with the same load as above in ten minutes, the biplane failed on account of a stiff wind.

On June 1st a U.S. officer went up 6,450 feet in a Burgess-Wright biplane, under the most favourable atmospheric conditions.

NOTICES OF BOOKS.

Grahame of Claverhouse, Viscount Dundee. By Michael Barrington. London. Martin Secker, 1911.

Mr. Michael Barrington, in the admirable preface wherein he sets forth his reasons for writing this new biography of the champion of a lost cause, claims that "the victor of Killiecrankie is here for the first time depicted from the military and practical and not the academic, antiquarian, or sentimental standpoint." There is much point in his contention that the lives of men of action are written by men of letters, who regard characters and actions from a different point of view to that of the men whose careers they illustrate. The author's love for and sympathy with his subject might well compensate for the lack of military knowledge and experience to which he candidly confesses; but he acknowledges that he has had the expert assistance of Lieut.-General Sir Edward Hutton in his account of the military operations, and all his information on the military customs, formations, and equipment of the period is characterized by painstaking accuracy. He has executed the historical part of his work with laudable fidelity to truth and fact; and in weighing the motives

and actions of his hero, he has striven to hold the balance fairly, and has, on the whole, succeeded. Few historical characters have had such opposing verdicts pronounced upon them by History and Posterity as Dundee; he has been the victim of political rancour and theological odium, and the exemplar of loyalty and chivalry; he has been alternatively travestied under the appellations of "Bluidy Claver'se," and "Bonnie Dundee." This latter epithet was quite unmerited, it having been really applied to the locality from which his title of nobility was derived, and it was transferred to the holder of the title by Sir Walter Scott without any historical or traditional warrant. Sir Walter's presentment of Claverhouse's personality in his novel of "Old Mortality," and in his "History of Scotland," is tinged with the popular Covenanting colouring of his character and exploits, in spite of a manifest desire to do him justice.

Macaulay, who said that Alison had written a History of Europe in 20 volumes to prove that Providence was always on the side of the Tories, and himself wrote an equally voluminous History of England to prove that Providence was always on the side of the Whigs, was grossly unfair to Claverhouse, accepting without reserve the stories of the Covenanting Divines who, like the priestly scribes of ancient Israel, wrote the annals of their people and their faith from their own point of view. Mr. Barrington strives, as we have said, to hold the balance impartially, but as an ardent and avowed admirer of Claverhouse he naturally inclines to put the most favourable construction on his motives and actions; and he does not err on the side of leniency in the judgments which he passes on the sayings and doings of his enemies. To the unbiassed student of the history of those troubled times there seems really little to choose between the deeds and manners of Loyalists and Patriots, Episcopalians or Presbyterians; "the Whigs were as dour as the Cavaliers were fierce;" the men on both sides were equally merciless after victory, and dogged under defeat.

The Grahames of Claverhouse were landed gentry whose ancient family boasted royal blood in its veins. Young John Grahame, like most sons of noble and gentle birth in his day, adopted the profession of arms, and made his first campaign in company with the Duke of Monmouth in the French Army, as a lieutenant in Sir William Lockhart's Scottish Regiment of Foot, and served at the siege of Maestricht. John Churchill, afterwards Duke of Marlborough, who had already seen service against the Moors at Tangier, was also serving in this campaign. But Great Britain, having made peace with Holland, all British subjects were recalled from the French service, and young Claverhouse then went over to the Dutch camp, and turned his sword against his late allies. He served as a volunteer with the Prince of Orange's Lifeguards, and is said to have saved the Prince's life at the battle of Seneffe. Macaulay discredits the story, which Mr. Barrington thinks may possibly be true, but it rests on no adequate proof. The corollary to it, that Claverhouse resigned the Dutch service from resentment at William's ingratitude, is equally baseless; after Seneffe the Prince gave him the command of a troop of horse, and he only resigned the Dutch service because he did not care to remain in a foreign army in time of peace. William gave him a flattering letter of recommendation to the Duke of York, which laid the foundation of his fortunes. The Duke offered him a lieutenancy in a regiment of horse that he was just raising, but Claverhouse declined it "for some unknown reason" says Mr. Barrington, but probably he did not choose to revert to a lower rank, and considered that his means

and his station entitled him to serve his sovereign as a captain; and he was shortly afterwards appointed captain of one of the three independent troops of horse which were raised to form the cavalry of King Charles II.'s military forces in Scotland.

It was at the head of this troop and an auxiliary troop of dragoons that he was defeated at Drumclog by a numerically very superior force of insurgent Covenanters. It is around this battle that Scott has woven his romance of "Old Mortality," in which he takes some liberties with historical facts, and makes many errors in military details. He makes Claverhouse colonel of the regiment of Scots Lifeguards, and calls his men indiscriminately lifeguardsmen and dragoons. There was no such regiment, but only one troop of Scots Lifeguards, to which Claverhouse did not belong; the horse and the dragoons were quite distinct branches of the service, but Sir Walter always confuses them, the distinction having become obliterated in his time. Moreover, he makes Francis Bothwell a sergeant in the lifeguards, in which there were no sergeants, as that rank did not then exist in the cavalry; there were only corporals of horse. Lord Macaulay has made the same mistake in attributing his spirited ballad on the Battle of Naseby to a sergeant in Ireton's Regiment of Horse. The independent troops of horse were afterwards amalgamated into a regiment of which Claverhouse was made colonel; the dragoons were also assembled in a regiment of Scottish dragoons, now the Scots Greys; but the King's Scottish Regiment of Horse was disbanded at the Revolution of 1688, on account of the opinions of its colonel; and only 50 or 60 troopers of it followed the fortunes of their leader and charged with him at Killiecrankie. Mr. Barrington has given a detailed account of the dress and equipment of the Scots Dragoons, whose uniform was at first grey with blue facings; the Lifeguards and Claverhouse's Horse were dressed in scarlet. The defeat at Drumclog was soon avenged by the victory of Bothwell Bridge, where Claverhouse commanded the left wing of the Royalist Army under his old comrade in arms the Duke of Monmouth; the slaughter of insurgent prisoners after the battle, which is commonly credited to him, is charged by the author to Tom Dalziel; neither of them were men to stick at anything in the discharge of what they believed to be their duty. Unremitting war was waged between the zealots who dreamed of setting up a Semitic Theocracy in Scotland, and the Loyalists, who maintained that the Divine Right of Kings was part of "the natural order of things by God established." The author stoutly defends his hero against the charge of cruelty, and it is quite possible that it was his energy and activity, more than his severity, that singled him out as an object of special execration to the Whig partisans; he calls himself in one of his letters "the terror of the godly," and in another he writes, "I am as sorry to see a man die, even a Whig, as any of themselves; but when one dies justly for his own faults, and may save a hundred to fall in the like, I have no scruple."

Mr. Barrington has modernized the spelling of Claverhouse's letters. This is unfortunate for the reason that he defends him against the charge of illiteracy levelled against him by Sir Walter Scott and others on the score of his bad spelling; but spelling was not a necessary accomplishment for colonels in those days, and it does not appear that he spelt any worse than most of his contemporaries.

When the Prince of Orange invaded England, the Scottish Army was ordered to join their English comrades to oppose him; and Claverhouse, now a Major-General of Horse, was second-in-command of the force which

marched from the Lothians to London. It comprised the Scots Lifeguards, the Scottish Horse and Dragoons, and two regiments of foot (now the Scots Guards and the Royal Scots Fusiliers). All these troops, with the exception of Claverhouse and a few other officers and soldiers, went over to the side of the invader, and abandoned the cause of their unfortunate sovereign. Yet they cannot with justice be branded as disloyal; they had a different standard of loyalty to that of Claverhouse; they were as loyal to their country as he was to his King.

Mr. Barrington, though critical of the statements of Whig historians, and severe on the exaggerations of Covenanting chroniclers, is too apt to give credence to the assertions of Jacobite pamphleteers, who sometimes lead him into strange errors of fact, as in the following passage:—

"Thus pacifically was accomplished one of the most unheroic revolutions that have ever taken place in the whole course of European history. 'That adorable and never-to-be-forgotten step of Divine Providence,' as Wodrow rapturously terms it, cannot now be thus confidently attributed to heavenly stage-management; and the time has come when it is allowable to smile at the cynical humour of William of Orange invading England in defence of the Protestant religion at the head of a large army of Catholic mercenaries."

The mercenaries who served William of Orange in his invasion of England were Swedes, Danes, Prussians, and French Huguenots, and it is doubtful if there was a single Catholic soldier in the army with which the Prince landed at Torbay. In the contracts made by William as Stadtholder of Holland with the Swiss Cantons for the levy of Swiss mercenaries for the Dutch service, we find an express stipulation that the officers and men shall all be of the Protestant reformed religion.

Claverhouse had done all that man could do to retrieve the fallen fortunes of his unlucky master, but all was done in vain. His secession from the Convention of the Scottish Estates furnished Sir Walter Scott with the material for his spirited ballad, which our author might have included in one of the many appendices to his book; he might also have said something more on the subject of the strange stories of witchcraft and supernatural achievement which have clustered round the name of Claverhouse in the imagination of the Scottish peasantry. King James's too tardy appreciation of his merits raised him to the rank and title of Viscount Dundee, and the closing chapters relate the history of his raising of the Highland clans and the brief and brilliant campaign which culminated in the fatal victory of Killiecrankie. Mr. Barrington shines more as an exponent of strategical plans and movements than of tactical actions. He calls Mackay's army at Killiecrankie "a solid phalanx," a curious term to apply to an extended line. His account of the battle is long and accurate, but it would be hard to beat the brief and vivid narrative of Sir Walter Scott in the "Tales of a Grandfather." Whatever faults and errors Dundee may have committed—they were many in the estimation of his enemies, few in that of his biographer—they were amply condoned by his heroic death in the arms of victory at the early age of forty-one. He had proved himself a skilful partisan leader, and had his life been prolonged he might have become a great General. But we cannot share Mr. Barrington's opinion that had his life been spared he would have restored the house of Stuart to the throne of Scotland. Even Montrose could not have done that; and Macaulay's contention that had Dundee lived, he would have shared Montrose's fate, is more consonant with

historical fact. The English and Scottish nations were solid in their determination not to submit to the rule of a Catholic King.

The letter alleged to have been written or dictated by Dundee in his last moments of life to King James has been generally supposed to be a Jacobite forgery; Mr. Barrington, however, believes in its authenticity, and gives the reasons for his belief in a lengthy appendix; other appendices contain chronicles of events in the life of Dundee, and of the marches and stages in his Highland campaign, musters of his forces, biographical sketches of his comrades in arms, and disquisitions on his portraits, of which four of the best known are given in this handsome volume. There are also portraits of Lady Dundee and of General Mackay, and maps of the scene of operations in the Highlands, and the battlefield of Killiecrankie; and a facsimile reproduction of an autograph letter from Claverhouse to Lord Queensberry. The book is furnished with a good index, and a full bibliography.

The only misprint in it occurs at page 264, where Vicksburg is spelt Vilksburg. In the table of contents Dundee's pedigree is referred to page 412, but on turning to it the page is found to be blank, and the pedigree is missing. F.H.T.

IMPORTANT NAVAL LITERATURE.

[*A selected list of books added to the Admiralty Library during June, 1912, supplied by courtesy of the Admiralty Librarian.*]

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THE PORT OF HAMBURG. By Edwin J. Clapp. New Haven, 1911.

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RELATION DE CE QUI S'EST PASSÉ ENTRE LES ARMÉES NAVALES DE FRANCE ET D'ANGLETERRE: ET CELLE DE HOLLANDE, PENDANT LES ANNÉES 1672 ET 1673. (*Narrative of events between the French, British, and Dutch Navies between* 1672 *and* 1673). Paris, 1674.

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FOREIGN PERIODICALS.

NAVAL.

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MITTEILUNGEN AUS DEM GEBIETE DES SEEWESENS. Pola: **No. VII., 1912.**—The Training of British Naval Officers. Main Armament and Under Water Protection of Battleships. Motor Engines for Ships. Aviation for the Navy. The Japanese battleship "Kongo." Mines and minelayers in the French Navy. French naval construction for 1913.

(Note.—Contents given last month were those for No. VI., not for No. III., as stated.—Ed.)

FRANCE.

REVUE MARITIME. Paris: **April, 1912.**—The strengthening of our naval squadrons. Proposed new method of training gun-layers. Proposed new design for a naval water tube boiler. Theoretical principles of aviation.† An Admiral Archbishop † (De Sourdis, 1594-1645). A study of the French laws on wrecks and wreckage.

LE YACHT. Paris: **1st June, 1912.**—The manœuvres of the Fleet. The Italian battleships of the Conte-di-Cavour type. **8th June: 15th June.**—The reorganization of the naval recruiting system. The loss of the "Vendémiaire." **22nd June.**—Boilers and engines.

LA MARINE FRANCAISE. Paris: **May, 1912.**—Not yet received.

LE MONITEUR DE LA FLOTTE. Paris: **1st June, 1912.**—New naval construction in 1913. Navy Estimates of 1913 in Parliament. **8th June.**—The Ecole Supérieure. The powder question in Parliament. **15th June.**—The loss of the "Vendémiaire." Systems of promotion. **22nd June.**—New motor torpedoes. The loss of the "Vendémiaire." The Navy in Parliament.

LA VIE MARITIME. Paris: **10th June, 1912.**—Not yet received.

GERMANY.

MARINE RUNDSCHAU. Berlin: **June, 1912.**—Early history of the Hohenzollern family in Brandenburg. Fresh light on the battle of Trafalgar (with four sketches). Hamburg, Rotterdam, and Antwerp in the 19th and 20th centuries. The Annual Report of the United States Navy, 1910-1911. The Turco-Italian War (up to 20th May, 1912).

ITALY.

RIVISTA MARITTIMA. Rome: **May, 1912.**—Emigration in the national fishing fleet, and the coast of Libya. A reliable compensator for a marine compass, with diagrams† (continued from August, 1911). Steam engines. (Different systems compared. A description with diagrams of the Stumpf and MacCastell engines).

UNITED STATES.

UNITED STATES NAVAL INSTITUTE PROCEEDINGS. Annapolis, Maryland. —Inspection duty at navy yards. William Barker Cushing (1842-1874).

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Panama Canal tolls. The Bagdad Railway and why it is of interest to the United States. Theory and operation of the Gyroscope and the Sperry Gyroscopic Compass. The improvement in floating dry docks. The destruction of the United States steam brig " Missouri " at Gibraltar. Co-ordination before and during war. The relative importance of turret and telescope sight. Swedish system of physical training. Simplified methods of pass correction. Shore patrol duty in the Navy. Diesel engines for naval purposes. Notes on aviation.

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FRANCE.

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REVUE DE CAVALERIE. Paris: **June, 1912.**—Comments on General Durand's articles on cavalry. German cavalry in the Imperial manœuvres of 1911. Souvenirs of the Crimea. Operations in Marocco (1911-12). The latest reorganization of the Chief Command in the French Army. Racing notes.

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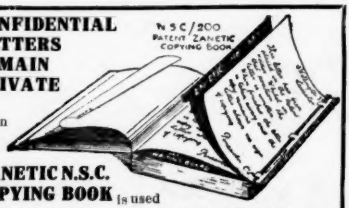

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